

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION



**BUDGET
ESTIMATES
FISCAL YEAR 2016**

CONGRESSIONAL SUBMISSION

PRIVILEGED

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the Congress.**

**Budget Estimates, Fiscal Year 2016
Congressional Submission**

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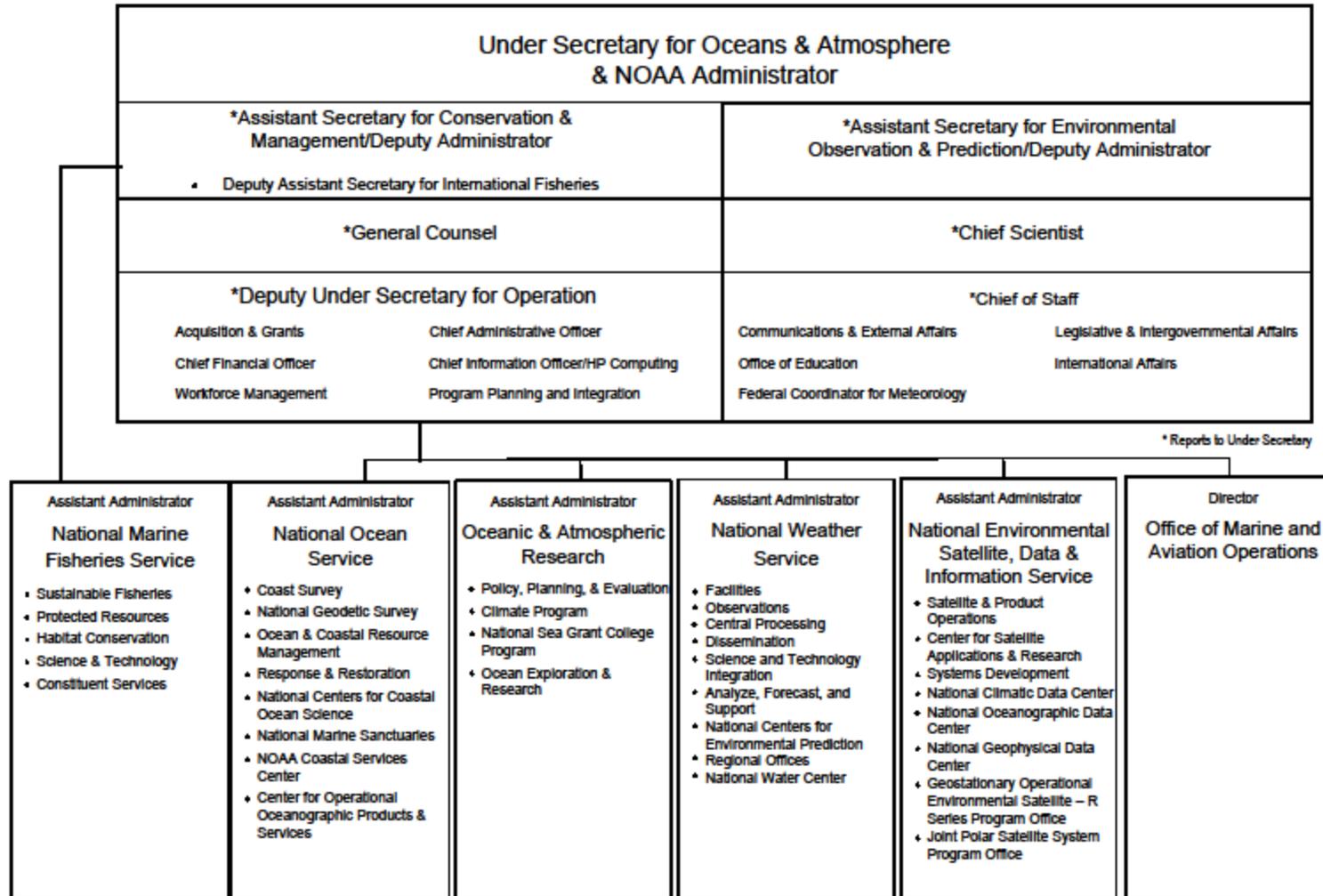
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**U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC & ATMOSPHERIC ADMINISTRATION**



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EXECUTIVE SUMMARY

Introduction

For Fiscal Year (FY) 2016, the National Oceanic and Atmospheric Administration (NOAA) proposes a discretionary budget of \$5,982,625,000, an increase of \$533,716,000, or 9.8 percent above NOAA's FY 2015 Enacted. The FY 2016 budget submission advances NOAA's position as an environmental intelligence and stewardship agency that puts critical information into the hands of the public to ensure human safety and maximize economic opportunity. This budget ties directly to overarching objectives that meet high priorities including: 1) providing information and services to make communities more resilient; 2) continuing to evolve the National Weather Service (NWS); 3) investing in observational infrastructure; and 4) achieving organizational excellence.

Below is a description, in greater detail, of some investments in each of the priority areas noted above:

Providing Information and Services to Make Communities More Resilient Communities across the country are becoming more vulnerable to severe events, like hurricanes, drought, and fisheries collapse, as well as the effects of climate change. The FY 2016 budget submission will strengthen the capacity of communities to respond to growing climate impacts, severe weather events, and risks associated with growing coastal populations and development. For example, the submission requests an increase of \$45,000,000 for the Regional Coastal Resilience Grants program, a competitive grants program, initiated in FY 2015, that will reduce the risks and impacts associated with extreme weather events, climate hazards, and changing ocean conditions on a regional scale. Expansion of this program would allow a greater number, and more geographically diverse set, of grantees – including states, territories, tribes, local governments, and other public and private entities – to collaborate on ways to plan for and improve coastal community resilience. In addition, NOAA requests an increase of \$5,000,000 to provide products and services that assist coastal communities with incorporating green infrastructure (e.g., natural systems, such as dunes and marsh grasses) into hazard mitigation, resilient coastal development, and post-event rebuilding. This proposal focuses on mitigation of long-term coastal inundation risks related to climate and other changes. In tandem with this request, NOAA seeks an increase of \$5,000,000 to improve understanding of the ecological connections between the fisheries and protected species that occur offshore and the coastal habitats that are most subject to human disturbance. Together these investments will promote healthier coastal communities and natural ecosystems.

Economic growth and prosperity are key components of community resilience. Thus, by protecting and strengthening coastal-dependent industries, such as fishermen and others who make their livelihoods from the coast, NOAA's FY 2016 request bolsters the economic resilience of communities. Through a \$3,000,000 initiative, NOAA's FY 2016 budget helps level the playing field between U.S. and foreign fishing industries by increasing enforcement against Illegal, Unreported, and Unregulated (IUU) fishing, which can give bad players an unfair advantage in the global seafood market and undermine the economic opportunity of the U.S. fishing industry. This budget strengthens and develops the Nation's seafood industry through a \$4,500,000 increase aimed at creating jobs and fostering increased trade opportunity by developing a robust and sustainable U.S. marine aquaculture industry. Of the total amount of seafood consumed in the United States, more than 90% (by value) is imported from foreign countries – and about half of that is produced by aquaculture. Creating an environment for a

safe and environmentally sustainable aquaculture industry in the U.S. – and the jobs it creates – is important to this Administration and Department.

Greater understanding of these connections will help inform more cost-effective management strategies of trust resources. Efforts such as mapping, biological surveys, socioeconomic valuation, and habitat predictive models will help NOAA make management decisions that maximize the sustainability and productivity of fisheries and marine ecosystems at least cost to industries. In FY 2016, NOAA also requests an increase of \$18,901,000 to strengthen consultation and permitting capacity required to meet mandates of the Endangered Species Act, Marine Mammal Protection Act, and Magnuson-Stevens Act. Increased species listings, natural hazards such as wide-scale drought, and response to human-caused disasters, such as the Deepwater Horizon oil spill, all necessitate increased capacity to ensure that permits and consultations are completed in a manner that is timely and that enables the Nation's economic engine to move forward without unnecessary delays. For example, this request will help NOAA work with its partners to ensure that recovery activities for recently listed coral species throughout the Pacific and Caribbean are adequately protected while enabling sustainable economic activity.

Evolving the Weather Service

In FY 2016, NOAA continues its commitment to build a Weather-Ready Nation and evolve the NWS to become a more agile decision support organization capable of timely response and increasingly accurate weather predictions to protect human lives and property. Increases in the frequency and severity of extreme weather, water, and climate events require NOAA to continue investments, initiated in FY 2015, in weather observation, processing, dissemination upgrades, and weather satellite systems. The FY 2016 budget requests \$7,420,000 to continue implementation of a Service Life Extension Program (SLEP) to overhaul the aging Next Generation Weather Radar (NEXRAD) infrastructure that underpins much of our severe weather forecast and warning services for high- impact events, such as tornadoes. The SLEP will extend the useful life of the NEXRAD array by approximately 15 years; without this continued investment, radar outages and gaps will increase, negatively impacting tornado and flash flood warnings. NOAA requests an increase of \$4,000,000 to expand NWS' hydrologic forecast services to provide improved flood forecasts and inundation mapping. This request builds on the FY 2015 initiative to develop and test new centralized national hydrologic modeling and forecast capabilities at the National Water Center (NWC) to provide nationally consistent flash flood services and dynamic flood inundation maps that illustrate the predicted locations and depths of urban flooding.

Impacts from severe storms in the U.S. cost billions of dollars and claim thousands of lives per year. Important decisions in sectors ranging from food security and public health, to emergency management and national security need actionable forecast information at timescales beyond traditional limits for skillful weather forecasts. For this reason, the FY 2016 budget includes \$9,000,000 to improve expertise in forecasting weather out to weeks three and four, where none exists today. Addressing this challenge will require sustained scientific research and research-to-operations efforts. In addition, to minimize the damage and loss of lives caused by severe weather, NOAA requests \$1,600,000 to improve the accuracy of warnings, extend lead times, and enhance decision support services for high impact weather, like tornados and flash floods. This funding will accelerate the operational implementation of a prototype Warn-on-Forecast modeling system for severe weather and will allow NOAA to develop better warning tools for NWS forecasters and the public. In addition, the FY 2016 budget invests \$2,400,000 in support of moving Research to Operations (R2O) and activities for space weather research observation systems and numerical model development. Space weather has the demonstrated potential to

disrupt every major public infrastructure system, including power grids, transportation systems, communications, satellites, and global positioning systems (GPS). NOAA is committed to improving its critical space weather prediction services by operationalizing its observation systems and suite of models to support key industries such as commercial airlines, electric power companies, and the GPS industry. National security and economic well-being are dependent on advanced technologies, which rely on accurate forecasts of space weather.

Investing in Observational Infrastructure

The break-up of the National Polar-orbiting Operational Environmental Satellite System (NPOESS) program left NOAA with increased responsibilities and insufficient resources in the critical few years of the Joint Polar Satellite System (JPSS) program to protect the Nation from a gap in polar weather data. Since NOAA took over this program, it has gotten stronger and has improved its execution and management. For the past two years, the program has been on time and within budget and has met every milestone set internally and by external reviewers. However, due to the timing of the NPOESS transition to JPSS, “on-schedule” still leaves a significant risk of a gap between the current Suomi National Polar-orbiting Partnership (SNPP) satellite and the planned JPSS-1 satellite. Polar information is critical to the Nation to protect life and property and is needed to provide accurate weather forecasts. The JPSS program was set to end after the JPSS-2 spacecraft, but the Nation will need data from polar orbiting weather satellites for many years to come.

Thus, to ensure the continuity of satellite operations to provide uninterrupted coverage of weather forecasts and environmental measurements into the future, in FY 2016, NOAA continues to invest in the JPSS and Geostationary Operational Environmental Satellite-R Series (GOES-R) programs as they prepare for the next set of polar and geostationary launches in the second quarter of 2017 and the second quarter of FY 2016, respectively. The FY 2016 budget also requests \$380,000,000 to initiate development activities for the Polar Follow On program and on risk mitigation options to reduce the potential for a gap in these critical observing systems, which would have disastrous consequences on NOAA’s ability to provide timely and accurate weather forecasts. For the protection of life and property, the Administration needs to start these investments now to ensure robustness in the Nation’s polar orbiting weather satellite program and to help mitigate the potential impacts to the NWS forecasts, services, and products in the event of a lapse in the continuity of these observing systems.

NOAA’s global observing systems are the foundation of the environmental intelligence we provide – without them NOAA is “flying blind” and the level of uncertainty in its forecasts and products will increase at a time when the public are demanding more data at an increasingly precise level. NOAA’s fleet, which includes an array of specialized aircraft and ships, operates throughout the world providing key observations in support of the full range of NOAA’s scientific and environmental missions. Without continued investment, the NOAA fleet is expected to decline from 16 active vessels in 2016 to eight active vessels in 2028, which would preclude the fleet from collecting the oceanographic, atmospheric, hydrographic, and fisheries data that informs NOAA’s management decisions and products and services. To prevent further degradation of NOAA’s at-sea data collection capability, this budget requests an increase of \$147,000,000 to begin construction of an Ocean Survey Vessel (OSV), a multi-use platform designed to conduct surveys throughout the U.S. Exclusive Economic Zone. OSVs have a more diverse range of capabilities and functions than any other vessel in the NOAA fleet. The first OSV would be completed by 2020.

Achieving organizational excellence

Each day, NOAA's employees strive to promote organizational excellence and execute our mission with discipline and consistency. To sustain its critical human capital NOAA must recruit, retain, reward, and develop the best talent possible and ensure that its customers – both internally and externally – receive the best service possible. The FY 2016 budget continues critical investments in organizational excellence through a \$4,341,000 requested increase in NOAA's Corporate Services. These services are the cornerstone of NOAA's ability to effectively execute its mission of science, service and stewardship. In recent years, NOAA's Corporate Services have faced significant challenges in performing critical oversight, guidance, and advisory services. NOAA has identified the need to build greater and higher quality capacity throughout Corporate Services to: provide oversight and support across NOAA mission areas; support acquisition efforts, recruit and retain a highly-skilled workforce; and mitigate risk of non-compliance with regulatory statutes. The FY 2016 request aims to begin to fortify workforce management while also enabling efficient implementation of cutting edge Departmental business and IT systems.

Revamping aging facilities is also critical to achieving organizational excellence since NOAA's laboratories and buildings house critical observational infrastructure and our most important asset – our workforce. The budget requests a \$4,700,000 funding increase for NWS field office relocations and repairs to address major system component failures and structural degradation in order to mitigate operational risks. Continued deterioration of these facilities will adversely affect mission readiness and impact service delivery, jeopardizing life and property.

Achieving organizational excellence also requires that we keep pace with technologies that speed the processing and dissemination of NOAA's environmental data and intelligence. To this end, NOAA requests an increase of \$9,000,000 to begin recapitalizing NOAA's Research and Development (R&D) High Performance Computing (HPC) infrastructure, which would allow regular refresh of the Gaea supercomputer and subsequent improved capacity for weather and climate modeling including \$3,500,000 for sea level rise. NOAA's R&D HPC assets are part of the critical infrastructure required for not only the climate and weather enterprises, but increasingly, across all of NOAA's mission areas.

Conclusion

In closing, NOAA's FY 2016 budget submission supports its role as the provider of one of the most diverse sets of environmental intelligence – from weather, water, and climate data to fisheries and hydrographic information. This submission, detailed further in the chapters and exhibits that follow, is critical at this point in time as NOAA faces the increasingly grave impacts of global climate change, continued budgetary constraints, and the potentially severe consequences of a lapse in vital weather satellite data. This budget will help the Administration and the Department realize its overarching priorities and communities across the United States better prepare for and respond to the growing environmental challenges the Nation faces.

Department of Commerce
 National Oceanic and Atmospheric Administration
PROGRAM AND PERFORMANCE: DIRECT OBLIGATIONS

(Dollar Amounts in Thousands)

Comparison by program/sub-program		FY 2014		FY 2015		FY 2016		FY 2016		Increase/ (Decrease)	
		Actuals		Currently Available		Base Program		Estimate		Personnel	Amount
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount		
NATIONAL OCEAN SERVICE (NOS)											
Navigation, Observations and Positioning	Pos/BA	529	188,150	581	192,461	581	195,500	581	195,500	0	0
	FTE/OBL	504	198,533	552	196,229	552	195,500	552	195,500	0	0
Coastal Science and Assessment	Pos/BA	273	78,933	313	80,000	313	81,600	313	85,600	0	4,000
	FTE/OBL	260	90,271	297	81,248	297	81,600	297	85,600	0	4,000
Ocean and Coastal Management and Services	Pos/BA	329	201,500	363	208,646	363	210,571	363	265,990	0	55,419
	FTE/OBL	313	200,698	346	212,803	346	210,571	346	265,990	0	55,419
Undistributed ATBs	Pos/BA	0	0	0	0	0	0	0	0	0	0
	FTE/OBL	0	0	0	0	0	0	0	0	0	0
TOTAL NOS - ORF	Pos/BA	1,131	468,583	1,257	481,107	1,257	487,671	1,257	547,090	0	59,419
	FTE/OBL	1,077	489,502	1,195	490,280	1,195	487,671	1,195	547,090	0	59,419
TOTAL NOS - PAC	Pos/BA	2	3,676	5	3,700	5	3,700	5	3,700	0	0
	FTE/OBL	2	4,163	5	5,374	5	3,700	5	3,700	0	0
Damage Assessment and Restoration Revolving Fund	Pos/BA	51	3,126	16	6,170	16	5,968	16	5,968	0	0
	FTE/OBL	51	146,766	16	159,550	16	20,968	16	20,968	0	0
Sanctuaries Asset Forfeiture Fund	Pos/BA	0	(34)	0	242	0	124	0	124	0	0
	FTE/OBL	0	198	0	458	0	124	0	124	0	0
Gulf Coast Ecosystem Restoration Fund	Pos/BA	0	0	0	2,078	0	2,078	0	2,078	0	0
	FTE/OBL	0	0	0	2,078	0	2,078	0	2,078	0	0
TOTAL NOS	Pos/BA	1,184	475,351	1,278	493,297	1,278	499,541	1,278	558,960	0	59,419
	FTE/OBL	1,130	640,629	1,216	657,740	1,216	514,541	1,216	573,960	0	59,419
NATIONAL MARINE FISHERIES SERVICES (NMFS)											
Protected Species Research and Management	Pos/BA	821	176,248	851	178,700	0	0	0	0	0	0
	FTE/OBL	782	175,289	810	182,753	0	0	0	0	0	0
Fisheries Research and Management	Pos/BA	1,415	421,469	1,448	428,238	0	0	0	0	0	0
	FTE/OBL	1,348	421,966	1,380	437,063	0	0	0	0	0	0

Department of Commerce
 National Oceanic and Atmospheric Administration
PROGRAM AND PERFORMANCE: DIRECT OBLIGATIONS

(Dollar Amounts in Thousands)

Comparison by program/sub-program		FY 2014		FY 2015		FY 2016		FY 2016		Increase/ (Decrease)	
		Actuals		Currently Available		Base Program		Estimate		Personnel	Amount
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount		
Enforcement and Observers/Training	Pos/BA	376	105,628	385	108,000	0	0	0	0	0	0
	FTE/OBL	358	108,129	366	113,111	0	0	0	0	0	0
Habitat Conservation & Restoration	Pos/BA	140	41,593	136	47,000	0	0	0	0	0	0
	FTE/OBL	133	41,034	130	47,559	0	0	0	0	0	0
Other Activities Supporting Fisheries	Pos/BA	190	59,960	212	60,200	0	0	0	0	0	0
	FTE/OBL	181	60,410	202	62,299	0	0	0	0	0	0
Protected Resources Science and Management	Pos/BA	0	0	0	0	852	184,589	887	214,211	35	29,622
	FTE/OBL	0	0	0	0	811	184,589	837	214,211	26	29,622
Fisheries Science and Management	Pos/BA	0	0	0	0	1,792	528,578	1,792	546,122	0	17,544
	FTE/OBL	0	0	0	0	1,706	528,578	1,706	546,122	0	17,544
Enforcement	Pos/BA	0	0	0	0	228	66,168	248	70,018	20	3,850
	FTE/OBL	0	0	0	0	217	66,168	232	70,018	15	3,850
Habitat Conservation & Restoration	Pos/BA	0	0	0	0	160	57,214	176	57,885	16	671
	FTE/OBL	0	0	0	0	154	57,214	166	57,885	12	671
Undistributed ATBs	Pos/BA	0	0	0	0	0	0	0	0	0	0
	FTE/OBL	0	0	0	0	0	0	0	0	0	0
TOTAL NMFS - ORF	Pos/BA	2,942	804,898	3,032	822,138	3,032	836,549	3,103	888,236	71	51,687
	FTE/OBL	2,802	806,828	2,888	842,785	2,888	836,549	2,941	888,236	53	51,687
TOTAL NMFS - PAC	Pos/BA	0	0	0	0	0	0	0	0	0	0
	FTE/OBL	0	2	0	1,954	0	0	0	0	0	0
Pacific Coastal Salmon Recovery Fund	Pos/BA	3	64,935	2	65,000	2	65,000	2	58,000	0	(7,000)
	FTE/OBL	3	64,960	2	65,001	2	65,000	2	58,000	0	(7,000)
Fishermen's Contingency Fund	Pos/BA	0	375	0	350	0	350	0	350	0	0
	FTE/OBL	0	172	0	832	0	350	0	350	0	0

Department of Commerce
 National Oceanic and Atmospheric Administration
PROGRAM AND PERFORMANCE: DIRECT OBLIGATIONS

(Dollar Amounts in Thousands)

Comparison by program/sub-program		FY 2014		FY 2015		FY 2016		FY 2016		Increase/ (Decrease)	
		Actuals		Currently Available		Base Program		Estimate		Personnel	Amount
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount		
Fisheries Finance Program	Pos/BA	0	14,629	0	22,757	0	0	0	10,300	0	10,300
Account	FTE/OBL	0	14,629	0	22,757	0	0	0	10,300	0	10,300
Federal Ship Financing	Pos/BA	0	(146)	0	0	0	0	0	0	0	0
	FTE/OBL	0	0	0	0	0	0	0	0	0	0
Promote and Develop Fisheries Products	Pos/BA	0	6,402	0	26,615	0	13,574	0	13,574	0	0
	FTE/OBL	0	11,098	0	33,432	0	13,574	0	13,574	0	0
Environmental Improvement and Restoration Fund	Pos/BA	0	17,688	0	1,311	0	3,221	0	3,221	0	0
	FTE/OBL	0	8,715	0	9,755	0	334	0	334	0	0
Limited Access System Administration Fund	Pos/BA	36	9,177	38	11,710	38	10,273	38	10,273	0	0
	FTE/OBL	36	8,081	38	10,893	38	11,525	38	11,525	0	0
Marine Mammal Unusual Mortality Event Fund	Pos/BA	0	1	0	0	0	0	0	0	0	0
	FTE/OBL	0	90	0	23	0	50	0	50	0	0
Western Pacific Sustainable Fisheries Fund	Pos/BA	0	118	0	322	0	250	0	250	0	0
	FTE/OBL	0	2,341	0	322	0	250	0	250	0	0
Fisheries Enforcement Asset Forfeiture Fund	Pos/BA	0	2,490	0	4,068	0	4,000	0	4,000	0	0
	FTE/OBL	0	2,665	0	4,052	0	4,000	0	4,000	0	0
North Pacific Observer Fund	Pos/BA	0	3,945	0	4,756	0	3,502	0	3,502	0	0
	FTE/OBL	0	3,045	0	5,657	0	3,502	0	3,502	0	0
Fisheries Disaster Assistance Fund	Pos/BA	0	74,925	0	0	0	0	0	0	0	0
	FTE/OBL	0	25,737	0	49,188	0	0	0	0	0	0
TOTAL NMFS	Pos/BA	2,981	999,437	3,072	959,027	3,072	936,719	3,143	991,706	71	54,987
	FTE/OBL	2,841	948,363	2,928	1,046,651	2,928	935,134	2,981	990,121	53	54,987
OFFICE OCEANIC AND ATMOSPHERIC RESEARCH (OAR)											
Climate Research											
Laboratories & Cooperative	Pos/BA	188	58,526	202	60,000	202	61,078	204	70,493	2	9,415
Institutes	FTE/OBL	179	59,519	190	61,410	190	61,078	192	70,493	2	9,415

Department of Commerce
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(Dollar Amounts in Thousands)

Comparison by program/sub-program		FY 2014		FY 2015		FY 2016		FY 2016		Increase/ (Decrease)	
		Actuals		Currently Available		Base Program		Estimate		Personnel	Amount
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount		
Regional Climate Data & Information	Pos/BA	24	36,736	21	38,000	21	38,125	25	52,437	4	14,312
	FTE/OBL	23	34,895	19	39,913	19	38,125	22	52,437	3	14,312
Climate Competitive Research	Pos/BA	96	58,073	66	60,000	66	60,326	67	65,830	1	5,504
	FTE/OBL	91	62,121	63	60,469	63	60,326	64	65,830	1	5,504
Total: Climate Research	Pos/BA	308	153,335	289	158,000	289	159,529	296	188,760	7	29,231
	FTE/OBL	293	156,535	272	161,792	272	159,529	278	188,760	6	29,231
Weather & Air Chemistry Research Laboratories & Cooperative Institutes	Pos/BA	238	63,544	217	70,000	226	72,086	228	68,104	2	(3,982)
	FTE/OBL	227	101,444	207	71,519	216	72,086	218	68,104	2	(3,982)
Weather & Air Chemistry Research Programs	Pos/BA	4	17,077	5	20,800	5	20,642	6	29,236	1	8,594
	FTE/OBL	4	16,964	5	21,001	5	20,642	6	29,236	1	8,594
Total: Weather & Air Chemistry Research	Pos/BA	242	80,621	222	90,800	231	92,728	234	97,340	3	4,612
	FTE/OBL	231	118,408	212	92,520	221	92,728	224	97,340	3	4,612
Ocean, Coastal, and Great Lakes Research Laboratories & Cooperative Institutes	Pos/BA	98	26,054	131	27,000	138	29,546	138	27,015	0	(2,531)
	FTE/OBL	93	24,109	125	29,974	132	29,546	132	27,015	0	(2,531)
National Sea Grant College Program	Pos/BA	15	66,821	15	67,300	15	67,383	15	68,452	0	1,069
	FTE/OBL	14	65,307	14	69,118	14	67,383	14	68,452	0	1,069
Ocean Exploration and Research	Pos/BA	26	25,815	20	28,000	20	28,124	20	19,344	0	(8,780)
	FTE/OBL	25	25,770	19	28,828	19	28,124	19	19,344	0	(8,780)
Other Ecosystem Programs	Pos/BA	15	5,957	14	8,500	14	8,583	20	30,005	6	21,422
	FTE/OBL	14	5,867	12	8,600	12	8,583	16	30,005	4	21,422
Sustained Observations and Monitoring	Pos/BA	17	40,708	49	41,300	49	41,596	49	41,596	0	0
	FTE/OBL	16	40,971	47	41,300	47	41,596	47	41,596	0	0

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PROGRAM AND PERFORMANCE: DIRECT OBLIGATIONS

(Dollar Amounts in Thousands)

Comparison by program/sub-program		FY 2014		FY 2015		FY 2016		FY 2016		Increase/ (Decrease)	
		Actuals		Currently Available		Base Program		Estimate		Personnel	Amount
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount		
Total: Ocean, Coastal, and Great Lakes Research	Pos/BA	171	165,355	229	172,100	236	175,232	242	186,412	6	11,180
	FTE/OBL	162	162,024	217	177,820	224	175,232	228	186,412	4	11,180
Innovative Research & Technology	Pos/BA	14	11,915	11	12,000	11	12,041	11	12,144	0	103
	FTE/OBL	13	11,321	10	12,808	10	12,041	10	12,144	0	103
Undistributed ATBs	Pos/BA	0	0	0	0	0	0	0	0	0	0
	FTE/OBL	0	0	0	0	0	0	0	0	0	0
TOTAL OAR - ORF	Pos/BA	735	411,226	751	432,900	767	439,530	783	484,656	16	45,126
	FTE/OBL	699	448,288	711	444,940	727	439,530	740	484,656	13	45,126
TOTAL OAR - PAC	Pos/BA	0	10,317	0	13,379	0	13,379	0	22,379	0	9,000
	FTE/OBL	0	30,598	0	17,446	0	13,379	0	22,379	0	9,000
TOTAL OAR	Pos/BA	735	421,543	751	446,279	767	452,909	783	507,035	16	54,126
	FTE/OBL	699	478,886	711	462,386	727	452,909	740	507,035	13	54,126
NATIONAL WEATHER SERVICE (NWS)*											
Operations and Research											
Local Warnings and Forecasts	Pos/BA	4,025	749,137	0	0	0	0	0	0	0	0
	FTE/OBL	3,834	760,715	0	0	0	0	0	0	0	0
Central Forecast Guidance	Pos/BA	323	97,998	0	0	0	0	0	0	0	0
	FTE/OBL	308	96,426	0	0	0	0	0	0	0	0
Total: Operations and Research	Pos/BA	4,348	847,135	0	0	0	0	0	0	0	0
	FTE/OBL	4,142	857,141	0	0	0	0	0	0	0	0
Systems Operation and Maintenance	Pos/BA	194	96,712	0	0	0	0	0	0	0	0
	FTE/OBL	185	95,913	0	0	0	0	0	0	0	0
Observations	Pos/BA	0	0	844	210,777	844	212,509	844	204,876	0	(7,633)
	FTE/OBL	0	0	804	226,270	804	212,509	804	204,876	0	(7,633)

Department of Commerce
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PROGRAM AND PERFORMANCE: DIRECT OBLIGATIONS

(Dollar Amounts in Thousands)

Comparison by program/sub-program		FY 2014		FY 2015		FY 2016		FY 2016		Increase/	
		Actuals		Currently Available		Base Program		Estimate		(Decrease)	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
Central Processing	Pos/BA	0	0	244	96,617	244	98,002	146	87,902	(98)	(10,100)
	FTE/OBL	0	0	232	100,620	232	98,002	134	87,902	(98)	(10,100)
Analyze, Forecast and Support	Pos/BA	0	0	3,163	483,060	3,163	493,545	3,163	489,845	0	(3,700)
	FTE/OBL	0	0	3,010	508,376	3,010	493,545	3,010	489,845	0	(3,700)
Dissemination	Pos/BA	0	0	86	40,099	86	46,743	86	46,743	0	0
	FTE/OBL	0	0	82	41,112	82	46,743	82	46,743	0	0
Science and Technology Integration	Pos/BA	0	0	514	123,600	514	125,697	514	134,197	0	8,500
	FTE/OBL	0	0	488	136,716	488	125,697	488	134,197	0	8,500
Undistributed ATBs	Pos/BA	0	0	0	0	0	0	0	0	0	0
	FTE/OBL	0	0	0	0	0	0	0	0	0	0
TOTAL NWS - ORF	Pos/BA	4,542	943,847	4,851	954,153	4,851	976,496	4,753	963,563	(98)	(12,933)
	FTE/OBL	4,327	953,054	4,616	1,013,094	4,616	976,496	4,518	963,563	(98)	(12,933)
TOTAL NWS - PAC	Pos/BA	31	112,938	23	133,300	23	130,300	23	135,315	0	5,015
	FTE/OBL	29	105,856	22	199,655	22	130,300	22	135,315	0	5,015
TOTAL NWS	Pos/BA	4,573	1,056,785	4,874	1,087,453	4,874	1,106,796	4,776	1,098,878	(98)	(7,918)
	FTE/OBL	4,356	1,058,910	4,638	1,212,749	4,638	1,106,796	4,540	1,098,878	(98)	(7,918)

*NWS FY15 Obligation amounts are estimates only under the new PPA structure. Carryover from previous years remains in the account in which it is appropriated and is therefore not directly mapped to a PPA in the new structure.

NATIONAL ENVIRONMENTAL SATELLITE, DATA AND INFORMATION SERVICE (NESDIS)*

Environmental Satellite Observing Systems

Office of Satellite and Product Operations	Pos/BA	227	91,345	0	0	0	0	0	0	0	0
	FTE/OBL	216	95,484	0	0	0	0	0	0	0	0
Product Development, Readiness & Application	Pos/BA	79	24,316	0	0	0	0	0	0	0	0
	FTE/OBL	75	24,739	0	0	0	0	0	0	0	0
Commercial Remote Sensing, Licensing and Enforcement	Pos/BA	5	993	0	0	0	0	0	0	0	0
	FTE/OBL	5	1,025	0	0	0	0	0	0	0	0

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(Dollar Amounts in Thousands)

Comparison by program/sub-program		FY 2014		FY 2015		FY 2016		FY 2016		Increase/ (Decrease)	
		Actuals		Currently Available		Base Program		Estimate		Personnel	Amount
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount		
Office of Space Commercialization	Pos/BA	2	596	0	0	0	0	0	0	0	0
	FTE/OBL	2	580	0	0	0	0	0	0	0	0
Group on Earth Observations (GEO)	Pos/BA	0	496	0	0	0	0	0	0	0	0
	FTE/OBL	0	496	0	0	0	0	0	0	0	0
Total: Environmental Satellite Observing Systems	Pos/BA	313	117,746	0	0	0	0	0	0	0	0
	FTE/OBL	298	122,324	0	0	0	0	0	0	0	0
Data Centers & Information Services											
Archive, Access and Assessment	Pos/BA	167	47,158	0	0	0	0	0	0	0	0
	FTE/OBL	159	47,435	0	0	0	0	0	0	0	0
Coastal Data Development	Pos/BA	12	4,534	0	0	0	0	0	0	0	0
	FTE/OBL	11	3,976	0	0	0	0	0	0	0	0
Regional Climate Services	Pos/BA	7	5,957	0	0	0	0	0	0	0	0
	FTE/OBL	7	6,041	0	0	0	0	0	0	0	0
Environmental Data Systems Moderization	Pos/BA	34	8,440	0	0	0	0	0	0	0	0
	FTE/OBL	32	8,417	0	0	0	0	0	0	0	0
Total: Data Centers & Information Services	Pos/BA	220	66,089	0	0	0	0	0	0	0	0
	FTE/OBL	209	65,869	0	0	0	0	0	0	0	0
Environmental Satellite Observing Systems											
Office of Satellite and Product Operations	Pos/BA	0	0	235	92,500	237	97,499	237	102,081	0	4,582
	FTE/OBL	0	0	235	93,125	237	97,499	237	102,081	0	4,582
Product Development, Readiness & Application	Pos/BA	0	0	88	26,000	88	26,316	88	26,316	0	0
	FTE/OBL	0	0	88	26,207	88	26,316	88	26,316	0	0
Commercial Remote Sensing, Licensing and Enforcement	Pos/BA	0	0	6	1,000	6	1,000	6	1,200	0	200
	FTE/OBL	0	0	6	1,090	6	1,000	6	1,200	0	200

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(Dollar Amounts in Thousands)

Comparison by program/sub-program		FY 2014		FY 2015		FY 2016		FY 2016		Increase/	
		Actuals		Currently Available		Base Program		Estimate		(Decrease)	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
Office of Space Commercialization	Pos/BA	0	0	4	600	4	600	4	1,000	0	400
	FTE/OBL	0	0	4	634	4	600	4	1,000	0	400
Group on Earth Observations (GEO)	Pos/BA	0	0	0	500	0	500	0	500	0	0
	FTE/OBL	0	0	0	500	0	500	0	500	0	0
Total: Environmental Satellite Observing Systems	Pos/BA	0	0	333	120,600	335	125,915	335	131,097	0	5,182
	FTE/OBL	0	0	333	121,556	335	125,915	335	131,097	0	5,182
National Environmental Information Office	Pos/BA	0	0	251	68,000	242	58,180	242	59,247	0	1,067
	FTE/OBL	0	0	251	69,125	242	58,180	242	59,247	0	1,067
Undistributed ATBs	Pos/BA	0	0	0	0	0	0	0	0	0	0
	FTE/OBL	0	0	0	0	0	0	0	0	0	0
TOTAL NESDIS - ORF	Pos/BA	533	183,835	584	188,600	577	184,095	577	190,344	0	6,249
	FTE/OBL	507	188,193	584	190,681	577	184,095	577	190,344	0	6,249
TOTAL NESDIS - PAC	Pos/BA	176	1,893,792	302	2,034,544	302	2,040,694	310	2,189,283	8	148,589
	FTE/OBL	167	1,889,502	301	2,046,736	302	2,040,694	308	2,189,283	6	148,589
TOTAL NESDIS	Pos/BA	709	2,077,627	886	2,223,144	879	2,224,789	887	2,379,627	8	154,838
	FTE/OBL	674	2,077,695	885	2,237,417	879	2,224,789	885	2,379,627	6	154,838

*NESDIS FY15 Obligation amounts are estimates only under the new PPA structure. Carryover from previous years remains in the account in which it is appropriated and is therefore not directly mapped to a PPA in the new structure

PROGRAM SUPPORT (PS)

Coporate Services

Under Secretary and Associate Offices	Pos/BA	122	26,809	147	27,000	147	27,188	147	27,188	0	0
	FTE/OBL	116	27,012	140	27,351	140	27,188	140	27,188	0	0
NOAA Wide Corporate Services & Agency Management	Pos/BA	614	166,028	725	162,000	716	194,677	731	199,018	15	4,341
	FTE/OBL	584	159,419	688	181,742	679	194,677	690	199,018	11	4,341
IT Security	Pos/BA	0	8,241	0	8,300	0	8,300	0	8,300	0	0
	FTE/OBL	0	7,029	0	9,530	0	8,300	0	8,300	0	0

Department of Commerce
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PROGRAM AND PERFORMANCE: DIRECT OBLIGATIONS

(Dollar Amounts in Thousands)

Comparison by program/sub-program		FY 2014		FY 2015		FY 2016		FY 2016		Increase/ (Decrease)	
		Actuals		Currently Available		Base Program		Estimate		Personnel	Amount
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount		
Total: Corporate Services	Pos/BA	736	201,078	872	197,300	863	230,165	878	234,506	15	4,341
	FTE/OBL	700	193,460	828	218,623	819	230,165	830	234,506	11	4,341
Office of Education	Pos/BA	22	32,326	25	27,600	25	27,631	25	16,431	0	(11,200)
	FTE/OBL	22	31,771	23	29,497	23	27,631	23	16,431	0	(11,200)
Facilities	Pos/BA	41	22,941	47	23,000	47	23,067	47	25,067	0	2,000
	FTE/OBL	39	21,334	45	25,338	45	23,067	45	25,067	0	2,000
Undistributed ATBs	Pos/BA	0	0	0	0	0	0	0	0	0	0
	FTE/OBL	0	0	0	0	0	0	0	0	0	0
TOTAL PROGRAM SUPPORT - ORF (without OMAO)	Pos/BA	799	256,345	944	247,900	935	280,863	950	276,004	15	(4,859)
	FTE/OBL	761	246,565	896	273,458	887	280,863	898	276,004	11	(4,859)
TOTAL PROGRAM SUPPORT - PAC (without OMAO)	Pos/BA	0	0	0	0	0	0	0	1,000	0	1,000
	FTE/OBL	0	791	0	223	0	0	0	1,000	0	1,000
TOTAL PROGRAM SUPPORT (without OMAO)	Pos/BA	799	256,345	944	247,900	935	280,863	950	277,004	15	(3,859)
	FTE/OBL	761	247,356	896	273,681	887	280,863	898	277,004	11	(3,859)
OFFICE OF MARINE AND AVIATION OPERATIONS (OMAO)											
Marine Operations & Maintenance	Pos/BA	855	168,794	869	175,000	869	178,838	869	178,838	0	0
	FTE/OBL	814	169,009	828	178,365	828	178,838	828	178,838	0	0
Aviation Operations	Pos/BA	124	30,979	127	31,600	127	32,293	127	32,293	0	0
	FTE/OBL	118	30,327	121	33,413	121	32,293	121	32,293	0	0
Undistributed ATBs	Pos/BA	0	0	0	0	0	0	0	0	0	0
	FTE/OBL	0	0	0	0	0	0	0	0	0	0
TOTAL OMAO - ORF	Pos/BA	979	199,773	996	206,600	996	211,131	996	211,131	0	0
	FTE/OBL	932	199,336	949	211,778	949	211,131	949	211,131	0	0
TOTAL OMAO - PAC	Pos/BA	0	5,166	0	6,000	0	6,000	5	158,700	5	152,700
	FTE/OBL	0	19,180	0	44,129	0	6,000	4	158,700	4	152,700

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(Dollar Amounts in Thousands)

Comparison by program/sub-program		FY 2014		FY 2015		FY 2016		FY 2016		Increase/ (Decrease)	
		Actuals		Currently Available		Base Program		Estimate		Personnel	Amount
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount		
Medicare Eligible Retiree	Pos/BA	0	1,936	0	1,936	0	1,936	0	1,936	0	0
Health Care Fund	FTE/OBL	0	1,315	0	1,936	0	1,936	0	1,936	0	0
NOAA Corps Commissioned Officers Retirement	Pos/BA	0	28,269	0	28,269	0	28,269	0	28,269	0	0
	FTE/OBL	0	26,147	0	28,269	0	28,269	0	28,269	0	0
TOTAL OMAO	Pos/BA	979	235,144	996	242,805	996	247,336	1,001	400,036	5	152,700
	FTE/OBL	932	245,978	949	286,112	949	247,336	953	400,036	4	152,700
NOAA ORF	Pos/BA	11,661	3,268,507	12,415	3,318,398	12,415	3,398,835	12,419	3,543,524	4	144,689
	FTE/OBL	11,105	3,331,766	11,839	3,467,016	11,839	3,416,335	11,818	3,561,024	(21)	144,689
NOAA PAC	Pos/BA	209	2,025,889	330	2,177,923	330	2,181,073	343	2,497,377	13	316,304
	FTE/OBL	198	2,050,092	328	2,315,517	329	2,194,073	339	2,510,377	10	316,304
NOAA Other	Pos/BA	90	227,836	56	175,584	56	138,545	56	141,845	0	3,300
	FTE/OBL	90	315,959	56	394,203	56	151,960	56	155,260	0	3,300

DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
JUSTIFICATION OF PROPOSED LANGUAGE CHANGES

JUSTIFICATION OF PROPOSED LANGUAGE CHANGES

1. NOAA Cost Recovery Language

SEC. 110. To carry out the responsibilities of the National Oceanic and Atmospheric Administration (NOAA), the Administrator of NOAA is authorized to: (1) enter into grants and cooperative agreements with; (2) use on a non-reimbursable basis land, services, equipment, personnel, and facilities provided by; and (3) receive and expend funds made available on a consensual basis from: a Federal agency, State or subdivision thereof, local government, tribal government, territory, or possession or any subdivisions thereof, foreign government, international or intergovernmental organization, public or private organization, or individual: Provided, That funds received for permitting and related regulatory activities pursuant to this section shall be deposited under the heading "National Oceanic and Atmospheric Administration—Operations, Research, and Facilities" and shall remain available until expended for such purposes: Provided further, That all funds within this section and their corresponding uses are subject to section 505 of this Act.

Justification

NOAA proposes to clarify NOAA's ability to receive and expend funds from, and to engage in agreements with, external entities to carry out its responsibilities related to permitting and other regulatory activities. These activities include, but are not limited to, scientific data collection and research that informs NOAA's decisions on permits and regulatory actions within its mission, and that informs the regulatory decisions of other agencies. Applicable statutes include, but are not limited to, the Endangered Species Act, Marine Mammal Protection Act, Magnuson-Stevens Fishery Conservation and Management Act, National Marine Sanctuaries Act and Oil Pollution Act. Examples are agreements and funding arrangements to: perform research on stock assessment and ecosystem processes for conservation and management purposes; perform oceanographic surveys to determine baseline for Oil Pollution Act purposes; perform research and development on oil spill response; and perform research on endangered species for purposes of ESA consultation, or on marine mammals for MMPA Incidental Harassment Authorizations, to inform permitting of infrastructure projects, oil and gas drilling or other regulated activities. This provision authorizes agreements for research and other activities that are not directly related to a particular permit or regulatory action but that anticipate regulatory action by NOAA or another agency.

DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
JUSTIFICATION OF PROPOSED LANGUAGE CHANGES

JUSTIFICATION OF PROPOSED LANGUAGE CHANGES

2. Availability for New Vessel Construction funds (under Procurement, Acquisition and Construction)

For procurement, acquisition and construction of capital assets, including alteration and modification costs, of the National Oceanic and Atmospheric Administration, \$2,498,679,000, to remain available until September 30, 2018, except that funds provided for the acquisition and construction of vessels and that funds provided for construction of facilities shall remain available until expended.

Justification

NOAA proposes language that would extend the period of availability of Procurement, Acquisition and Construction funds for vessel acquisition and construction from three fiscal years until expended. NOAA vessel acquisition and construction activities have an initial 12 month design phase followed by a 36 month construction phase with additional time necessary post construction for shakedown and warranty work. OMB Circular A-11 Section 31.5 and the supplemental Capital Programming Guide state that sufficient budget authority to cover all costs of a capital asset acquisition should be requested at once then appropriated and enacted in full before any obligations are incurred. OMB Circular A-11 Section 31.7 also states that the period of availability should be matched to the expected length of the acquisition cycle for multi-year appropriations supporting capital asset acquisitions. Extending the period of availability will allow NOAA to align the availability of the appropriation with the current acquisition cycle and will allow NOAA to request the total cost of the program up front. Previous vessel acquisitions have required obligation of funds for post construction shakedown and warranty work in advance based on the time constraint of funds expiration rather than program execution and also have resulted in requests for additional funds to complete the delivery of the vessel. Allowing funds to be available until expended will reduce the risk to the program and will provide options for reobligation in the event that funds need to be deobligated.

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1. For necessary expenses of activities authorized by law for the National Oceanic and Atmospheric Administration,

5 USC 5348	15 USC 1511 b-e	16 USC 4101 et seq.	33 USC 2801 et seq.	PL 111-11, Sec 12202
5 USC 4703	15 USC 1514	16 USC 4701 et seq.	33 USC 3001 et seq.	PL 111-11, Sec 12304
7 USC 1622	15 USC 1517	16 USC 5001 et seq.	33 USC 3044 et seq.	PL 111-11, Sec 12404
10 USC 1072	15 USC 1537-40	31 USC 1105	33 USC 3045	PL 111-11, Sec 12502
10 USC 1111-1115	16 USC 661 et seq.	33 USC 706 et seq.	33 USC 3046	
10 USC 2311	16 USC 757a et seq.	33 USC 883 a-i et seq.	33 USC 4001	
12 USC 1715m	16 USC 1361	33 USC 891 et seq.	PL 111-281, Sec 708	
15 USC 313	16 USC 1431 et seq.	33 USC 893 a-b,	42 USC 8902-05	
15 USC 313a	16 USC 1447a et seq.	as amended	42 USC 9601 et seq.	
15 USC 313b	16 USC 1451 et seq.	33 USC 1121-1131	43 USC 1347e	
15 USC 313nt	16 USC 1456a	33 USC 1251	44 USC 1307	
15 USC 325	16 USC 1531 et seq.	33 USC 1321	49 USC 44720	
15 USC 330b	16 USC 1801 et seq.	33 USC 1441-44	97 Stat. 1409	
15 USC 330e	16 USC 3645	33 USC 2706	PL 111-11, Sec 12002	

Organizations and Employees

5 USC 5348 - Crews of Vessels

“...the pay of officers and members of crews of vessels excepted from chapter 51 of this title by section 5102(c)(8) of this title shall be fixed and adjusted from time to time as nearly as is consistent with the public interest in accordance with prevailing rates and practices in the maritime industry.”

5 USC 4703- Demonstration Projects

“...the Office of Personnel Management may, directly or through agreement or contract with one or more agencies and other public and private organizations, conduct and evaluate demonstration projects.”

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Agriculture

7 USC 1622 - Distribution and Marketing of Agricultural Products

“The Secretary ... is directed and authorized: ...

- (a) to determine the needs and develop or assist in the development of plans for the proper assembly, processing, transportation, storage, distribution, and handling of agricultural (fish) products.
- (f) to conduct and cooperate in consumer education for the more effective utilization and greater consumption of agricultural products (fish)...
- (g) to collect and disseminate marketing information... for the purpose of ... bringing about a balance between production and utilization of agricultural (fish) products.
- (h) to inspect, certify, and identify the class, quality, quantity and condition of agricultural (fish) products ...
- (m) to conduct ... research ... to determine the most efficient ... processes for the handling, storing, preserving, protecting...of agricultural (fish) commodities ...”

(h) - Duties of Secretary relating to agricultural products; penalties

“Whoever knowingly shall falsely make, issue, alter, forge, or counterfeit any official certificate, memorandum, or other identification, with respect to inspection, class, grade, quality, size, quantity, or condition, issued or authorized under this section or knowingly cause or procure, or aid, assist in, or be a party to, such false making, issuing, altering, forging, or counterfeiting, or whoever knowingly shall possess, without promptly notifying the Secretary (of Commerce) or his representative, utter, published, or used as true, any such falsely made, altered forged, or counterfeited official certificate, memorandum, mark, identification, or device, or whoever knowingly represents that an agricultural product has been officially inspected or graded...when in fact such commodity has not been so graded or inspected shall be fined not more than \$1,000 or imprisoned not more than one year, or both.”

Armed Forces

10 USC 1072 Medical and Dental Care

“...The term “uniformed services” means the armed forces and the Commissioned Corps of the National Oceanic and Atmospheric Administration and of the Public Health Service.”

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10 USC 1111-1115 Determinations of Contributions to the Fund

PL 108-375, Sec. 725 Revised funding methodology for military retiree health care benefits states: "At the beginning of each fiscal year after September 30, 2005, the Secretary of the Treasury shall promptly pay into the Fund from the General Fund of the Treasury--(1) the amount certified to the Secretary by the Secretary of Defense under subsection (c), which shall be the contribution to the Fund for that fiscal year required by section 1115; and (2) the amount determined by each administering Secretary under section 1111(c) as the contribution to the Fund on behalf of the members of the uniformed services under the jurisdiction of that Secretary."

10 USC 2311 Assignment and Delegation of Procurement Functions and Responsibilities

- (a) In General.--Except to the extent expressly prohibited by another provision of law, the head of an agency may delegate, subject to his direction, to any other officer or official of that agency, any power under this chapter.
- (b) Procurements For or With Other Agencies.--Subject to subsection (a), to facilitate the procurement of property and services covered by this chapter by each agency named in section 2303 of this title for any other agency, and to facilitate joint procurement by those agencies--
 - (1) the head of an agency may delegate functions and assign responsibilities relating to procurement to any officer or employee within such agency;
 - (2) the heads of two or more agencies may by agreement delegate procurement functions and assign procurement responsibilities from one agency to another of those agencies or to an officer or civilian employee of another of those agencies; and
 - (3) the heads of two or more agencies may create joint or combined offices to exercise procurement functions and responsibilities.

Banks and Banking

12 USC 1715m - Mortgage Insurance for Servicemen [NOAA Corps]

This section authorizes payment of Federal Housing Administration (FHA) home mortgage insurance premiums to NOAA Corps Officers.

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Commerce and Trade

15 USC 313 - Duties of Secretary of Commerce [National Weather Service]

“The Secretary of Commerce...shall have charge of the forecasting of weather,...issue of storm warnings,...weather and flood signals,... gauging and reporting of rivers,...collection and transmission of marine intelligence...,...reporting of temperature and rainfall conditions..., the display of frost and cold-wave signals, the distribution of meteorological information..., and the taking of such meteorological observations as may be necessary to establish and record the climatic conditions of the United States, or as are essential for the proper execution of the foregoing duties.”

15 USC 313a - Establishment of Meteorological Observation Stations in the Arctic Region

“... The Secretary of Commerce shall ... take such actions as may be necessary in the development of an international basic meteorological reporting network in the Arctic region of the Western Hemisphere...”

15 USC 313b - Institute for Aviation Weather Prediction

“The Administrator of the National Oceanic and Atmospheric Administration shall establish an Institute for Aviation Weather Prediction. The Institute shall provide forecasts, weather warnings, and other weather services to the United States aviation community....”

15 USC 313 note - Weather Service Modernization Act

- (a) As part of the budget justification documents submitted to Congress in support of the annual budget request for the department of Commerce, the Secretary shall include a National Implementation Plan for modernization of the National Weather Service for each fiscal year following fiscal year 1993 until such modernization is complete. The Plan shall set forth the actions, during the 2-year period beginning with the fiscal year for which the budget request is made, that will be necessary to accomplish the objectives described in the Strategic Plan.

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15 USC 325 - Spending Authority for the National Weather Service

“...Appropriations now or hereafter provided for the National Weather Service shall be available for: (a) furnishing food and shelter...to employees of the Government assigned to Arctic stations; (b) equipment and maintenance of meteorological offices and stations, and maintenance and operation of meteorological facilities outside the United States... (c) repairing, altering, and improving of buildings occupied by the National Weather Service, and care and preservation of grounds...(d) arranging for communication services... and
(e) purchasing tabulating cards and continuous form tabulating paper .

15 SC 330b - Duties of Secretary relating to Weather Modification Activities or Attempts - Reporting Requirement

- (a) “The Secretary shall maintain a record of weather modification activities, including attempts, which take place in the United States and shall publish summaries thereof from time to time as he determines.”
- (b) “All reports, documents, and other information received by the Secretary under the provisions of this chapter shall be made available to the public to the fullest practicable extent.”

15 USC 330e - Authorization of Appropriations relating to Weather Modification Activities or Attempts - Reporting Requirement

This section provides funding authority to support the reporting requirements specified in this chapter.

15 USC 1511b - United States Fishery Trade Officers

“For purposes of carrying out export promotion and other fishery development responsibilities, the Secretary of Commerce...shall appoint not fewer than six officers who shall serve abroad to promote United States fishing interests. These officers shall be knowledgeable about the United States fishing industry, preferably with experience derived from the harvesting, processing, or marketing sectors of the industry or from the administration of fisheries programs. Such officers, who shall be employees of the Department of Commerce, shall have the designation of fishery trade officers.”

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15 USC 1511c - NOAA Estuarine Programs Office

“... The Estuarine Programs Office shall develop, coordinate, and implement the estuarine activities of the administration with the activities of other Federal and State agencies. There are authorized to be appropriated to the Administration not to exceed \$560,000 for fiscal year 1989, and \$600,000 for fiscal year 1990.”

15 USC 1511d - Chesapeake Bay Office

The Secretary of Commerce shall establish, within the National Oceanic and Atmospheric Administration, an office to be known as the Chesapeake Bay Office...which shall provide technical assistance on processes impacting the Chesapeake Bay system, its restoration and habitat protection; develop a strategy to meet the commitments of the Chesapeake Bay Agreement; and coordinate programs and activities impacting the Chesapeake Bay, including research and grants.

15 USC 1511e - Office of Space Commercialization

“There is established with the Department of Commerce an Office of Space Commercialization” which shall “promote commercial provider investment in space activities...assist United States commercial providers in [their efforts to] conduct business with the United States Government, [act] as an industry advocate within the executive branch..., ensure that the United States Government does not compete with United States commercial providers..., [promote] the export of space-related goods and services, [represent] the Department of Commerce in the development of United States policies...and [seek] the removal of legal, policy, and institutional impediments to space commerce.”

15 USC 1514 - Basic Authority for Performance of Certain Functions and Activities of Department

“Appropriations are authorized for the following activities of the Department of Commerce:

- (a) furnishing to employees...and their dependents, in Alaska and other points outside the continental United States, free emergency medical services...and supplies;
- (b) purchasing, transporting, storing, and distributing food and other subsistence supplies for resale to employees...and their dependents, in Alaska and other points outside the continental United States at a reasonable value...; the proceeds from such resales to be credited to the appropriation from which the expenditure was made;
- (c) ...establishment, maintenance, and operation of messing facilities, by contract or otherwise, in Alaska and other points outside the continental United States..., such service to be furnished to employees...and their dependents,...

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- (d) reimbursement...of officers or employees in or under the Department...for food, clothing, medicines, and other supplies furnished by them in emergencies for the temporary relief of dislocated persons in remote localities;
- (e) providing motion-picture equipment and film for recreation of crews of vessels..., for recreation for employees in remote localities..., and for training purposes;
- (f) erecting, altering, repairing, equipping, furnishing, and maintaining...such living and working quarters and facilities as may be necessary to carry out its authorized work at remote localities not on foreign soil where such living and working accommodations are not otherwise available.”

15 USC 1517 - Transfer of Statistical or Scientific Work

“The President is authorized, by order in writing, to transfer at any time the whole or any part of any office, bureau, division, or other branch of the public service engaged in statistical or scientific work, from the Department of State, the Department of the Treasury, the Department of Defense, the Department of Justice, the United States Postal Service, or the Department of the Interior, to the Department of Commerce; and in every such case the duties and authority performed by and conferred by law upon such office, bureau, division, or other branch of the public service, or the part thereof so transferred, shall be thereby transferred with such office, bureau, division, or other branch of the public service, or the part thereof which is so transferred. All power and authority conferred by law, both supervisory and appellate, upon the department from which such transfer is made, or the Secretary thereof, in relation to the said office, bureau, division, or other branch of the public service, or the part thereof so transferred, shall immediately, when such transfer is so ordered by the President, be fully conferred upon and vested in the Department of Commerce, or the Secretary thereof, as the case may be, as to the whole or part of such office, bureau, division, or other branch of the public service so transferred.”

15 USC 1537 - 1539 Needs Assessment for Data Management

“Not later than 12 months after October 29, 1992, and at least biennially thereafter, the Secretary of Commerce shall complete an assessment of the adequacy of the environmental data and information systems of NOAA.”

15 USC 1540 – Cooperative Agreements

“The Secretary of Commerce, acting through the Under Secretary of Commerce for Oceans and Atmosphere, may enter into cooperative agreements and other financial agreements with any nonprofit organization to (1) aid and promote scientific and educational activities to foster public understanding of the National Oceanic and Atmospheric Administration or its programs; and (2) solicit private donations for the support of such activities.”

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Conservation

16 USC 661 et seq.- Declaration of Purpose; Cooperation of Agencies; Surveys and Investigations; Donations

“...the Secretary of the Interior is authorized (1) to provide assistance to, and cooperate with, Federal, State, and public or private agencies and organizations in the development, protection, rearing, and stocking of all species of wildlife, resources thereof, and their habitat, in controlling losses of the same from disease or other causes, in minimizing damages from overabundant species, in providing public shooting and fishing areas, including easements across public lands for access thereto, and in carrying out other measures necessary to effectuate the purposes of said sections; (2) to make surveys and investigations of the wildlife of the public domain, including lands and waters or interests therein acquired or controlled by any agency of the United States; and (3) to accept donations of land and contributions of funds in furtherance of the purposes of said sections.”

16 USC 757a et seq.- Anadromous, Great Lakes, and Lake Champlain Fisheries

The Act authorizes cooperative agreements with States “that are concerned with the development, conservation, and enhancement of [anadromous] fish” (section 757a(a)).

16 USC 1361 - Congressional Findings

“The Congress finds that - (1) certain species and population stocks of marine mammals are, or may be, in danger of extinction or depletion as a result of man's activities;”

“The Secretary is authorized to make grants, or to provide financial assistance in such other form as he deems appropriate, to any Federal or State agency, public or private institution, or other person for the purpose of assisting such agency, institution, or person to undertake research in subjects which are relevant to the protection and conservation of marine mammals, and shall provide financial assistance for, research into new methods of locating and catching yellow-fin tuna without the incidental taking of marine mammals.”

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16 USC 1431 et seq. - Findings, Purposes, and Policies [The National Marine Sanctuaries Act, as amended]

(b) Purposes and Policies

“The purposes and policies of this title are -

- (1) to identify and designate as national marine sanctuaries areas of the marine environment which are of special national significance;
- (2) to provide authority for ... conservation and management of these marine areas ...
- (3) to support, promote, and coordinate scientific research on, and monitoring of, the resources of these marine areas...
- (4) to enhance public awareness, understanding, appreciation, and wise use of the marine environment;
- (5) to facilitate to the extent compatible with the primary objective of resource protection, all public and private uses of the resources of these marine areas not prohibited pursuant to other authorities;
- (6) to develop and implement coordinated plans for the protection and management of these areas...;
- (7) to create models of, and incentives for, ways to conserve and manage these areas...”
- (8) to cooperate with global programs ...; and
- (9) to maintain, restore, and enhance living resources ...”

16 USC 1447a et seq. - Regional Marine Research Programs

Authorizes NOAA/EPA and Governors of certain states to appoint members to a number of regional marine research boards. Each board is to develop a comprehensive four year marine research plan and “the Administrator of the National Oceanic and Atmospheric Administration shall administer a grant program to support the administrative functions of each Board.”

Authorization for the Boards expires on October 1, 1999. The authorization for appropriations expired at the end of fiscal year 1996.

16 USC 1451 et seq. - Findings, Purposes, and Policies [Coastal Zone Management Act]

Establishes a voluntary partnership between the Federal Government and coastal States. It also establishes the National Estuarine Reserve Research program, in which the Secretary of Commerce may designate an estuarine area as a national estuarine research reserve in consultation with governor of affected state.

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16 USC 1456a – Coastal Zone Management Fund

“(b) (1) The Secretary shall establish and maintain a fund, to be known as the ‘Coastal Zone Management Fund’, which shall consist of amounts retained and deposited into the Fund under subsection (a) of this section and fees deposited into the Fund under section 1456 (i) (3) of this title”

16 USC 1531 et seq. – Congressional Findings and Declaration of Purposes and Policy

The purposes of the Act are “to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, to provide a program for the conservation of such endangered species and threatened species, and to take such steps as may be appropriate to achieve the purposes of the treaties and conventions set forth in [the statute]” (section 1531(b)).

16 USC 1801 et seq. - Magnuson-Stevens Fishery Conservation and Management Act

The primary purpose of the Act is “to take immediate action to conserve and manage the fishery resources found off the coasts of the United States (section 1801(b)(1)).”

16 USC 3645 - Pacific Coastal Salmon Recovery

“(A) For salmon habitat restoration, salmon stock enhancement, and salmon research, including the construction of salmon research and related facilities, there is authorized to be appropriated for each of fiscal years 2000, 2001, 2002, and 2003, \$90,000,000 to the States of Alaska, Washington, Oregon, and California. Amounts appropriated pursuant to this subparagraph shall be made available as direct payments. The State of Alaska may allocate a portion of any funds it receives under this subsection to eligible activities outside Alaska.”

Amended in PL109-479 Section 302(d) as follows: Section 16(d)(2)(A) of the Pacific Salmon Treaty, as transferred by paragraph (1), is amended—

- (1) by inserting “sustainable salmon fisheries,” after “enhancement,”;
- (2) by inserting “2005, 2006, 2007, 2008, and 2009,” after “2003”; and
- (3) by inserting “Idaho,” after “Oregon,”.

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16 USC 4101 et seq. – Interjurisdictional Fisheries

“The purposes of this chapter are - (1) to promote and encourage State activities in support of the management of interjurisdictional fishery resources, and (2) to promote and encourage management of interjurisdictional fishery resources through their range” (section 4101).

16 USC 4701 et seq. - Aquatic Nuisance Prevention and Control

Establishes an interagency Aquatic Nuisance Species Task Force, of which the Administrator of NOAA is a co-chair. The task force’s responsibilities include developing and implementing “a program for waters of the United States to prevent introduction and dispersal of aquatic nuisance species; to monitor, control and study such species; and to disseminate related information.”

16 USC 5001 et seq. - Purpose of Convention

“It is the purpose ... to implement the Convention for the Conservation of Anadromous Stocks in the North Pacific Ocean, signed in Moscow, February 11, 1992.”

Money and Finance

31 USC 1105 - Budget Contents and Submission to Congress

(a) On or after the first Monday in January but not later than the first Monday in February of each year, the President shall submit a budget of the United States Government for the following fiscal year. Each budget shall include a budget message and summary and supporting information.

Amended in PL108-447 (FY 2005 Omnibus Appropriations Act) as follows: “*Provided further*, That beginning in fiscal year 2006 and for each fiscal year thereafter, the Secretary of Commerce shall include in the budget justification materials that the Secretary submits to Congress in support of the Department of Commerce budget (as submitted with the budget of the President under section 1105(a) of title 31, 10 United States Code) an estimate for each National Oceanic and Atmospheric Administration procurement, acquisition and construction program having a total multiyear program cost of more than \$5,000,000 and simultaneously the budget justification materials shall include an estimate of the budgetary requirements for each such program for each of the 5 subsequent fiscal years.”

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Navigation and Navigable Waters

33 USC 706 et seq. - Department of Commerce; Current Precipitation Information; Appropriation

“There is authorized an expenditure as required,..., for the establishment, operation, and maintenance by the Secretary of Commerce of a network of recording and non-recording precipitation stations, known as the Hydroclimatic Network, whenever...such service is advisable...”

33 USC 883a et seq. - Surveys and Other Activities.

“...the Secretary...is authorized to conduct the following activities:

- (1) Hydrographic and topographic surveys;
- (2) Tide and current observations;
- (3) Geodetic-control surveys;
- (4) Field surveys for aeronautical charts;
- (5) Geomagnetic, seismological, gravity, and related geophysical measurements and investigations, and observations ...”

33 USC 883b - Dissemination of Data; Further Activities

“...the Secretary is authorized to conduct the following activities:

- (1) Analysis and prediction of tide and current data;
- (2) Processing and publication of data...;
- (3) Compilation and printing of nautical charts...;
- (4) Distribution of nautical charts...”

33 USC 883c - Geomagnetic Data; Collection; Correlation, and Dissemination

“To provide for the orderly collection of geomagnetic data...the Secretary ... is authorized to collect, correlate, and disseminate such data.”

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33 USC 883d - Improvement of Methods, Instruments, and Equipments; Investigations and Research

“...the Secretary ... is authorized to conduct developmental work for the improvement of surveying and cartographic methods, instruments, and equipments; and to conduct investigations and research in geophysical sciences...”

33 USC 883e - Cooperative Agreements for Surveys and Investigations; Contribution of Costs Incurred by National Oceanic and Atmospheric Administration

“(1) The Secretary of Commerce is authorized to enter into cooperative agreements with, and to receive and expand funds made available by... for surveys or investigations... or for performing related surveying and mapping activities... and for the preparation and publication of the results thereof.”

“(2) The Secretary of Commerce is authorized to establish the terms of any cooperative agreement entered into ... including the amount of funds to be received ... which the Secretary determines represents the amount of benefits derived ... from the cooperative agreement.”

33 USC 883f - Contracts with Qualified Organizations

“The Secretary is authorized to contract with qualified organizations for the performance of any part of the authorized functions of the National Ocean Survey...”

33 USC 883h - Employment of Public Vessels

“The President is authorized to cause to be employed such of the public vessels as he deems it expedient to employ, and to give such instructions for regulating their conduct as he deems proper in order to carry out the provisions of this subchapter.”

33 USC 883i - Authorization of Appropriations

“There are hereby authorized to be appropriated such funds as may be necessary to acquire, construct, maintain, and operate ships, stations, equipment, and facilities and for such other expenditures, including personal services at the seat of government and elsewhere and including the erection of temporary observatory buildings and lease of sites therefore as may be necessary...”

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33 USC 891 et seq. - Fleet Replacement and Modernization Program

“The Secretary is authorized to implement... a 15-year program to replace and modernize the NOAA fleet.”

33 USC 893 et seq. - Research, Development, and Education

“The Administrator...shall establish a coordinated program of ocean, coastal, Great Lakes, and atmospheric research and development...that shall focus on the development of advanced technologies and analytical methods that will promote United States leadership in ocean and atmospheric science and competitiveness in the applied uses of such knowledge.”

33 USC 1121-1124, 1126-1129, 1131 - National Sea Grant College Program Act

The Sea Grant Act authorizes the awarding of grants and contracts to initiate and support programs at Sea Grant colleges and other institutions for research, education, and advisory services in any field related to the conservation and development of marine resources.

In 2008, PL 110-394 (National Sea Grant College Program Amendments Act of 2008) amended 33 USC 1124 as follows –

- (1) by striking “204(c)(4)(F).” in subsection (a) and inserting “204(c)(4)(F) or that are appropriated under section 208(b).”; and
- (2) by striking the matter following paragraph (3) in subsection (b) and inserting the following -

“The total amount that may be provided for grants under this subsection during any fiscal year shall not exceed an amount equal to 5 percent of the total funds appropriated for such year under section 212.”.

PL 110-394 amended 33 USC 1127 as follows –

- (1) by striking “Not later than 1 year after the date of the enactment of the National Sea Grant College Program Act Amendments of 2002, and every 2 years thereafter,” in subsection (a) and inserting “Every 2 years,”; and (2) by adding at the end the following:

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“(c) Restriction on Use of Funds.--Amounts available for fellowships under this section, including amounts accepted under section 204(c)(4)(F) or appropriated under section 212 to implement this section, shall be used only for award of such fellowships and administrative costs of implementing this section.”

PL 110-394 amended 33 USC 1131 as follows –

- (1) by striking subsection (a)(1) and inserting the following: “(1) In general.--There are authorized to be appropriated to the Secretary to carry out this title—
 - “(A) \$72,000,000 for fiscal year 2009;
 - “(B) \$75,600,000 for fiscal year 2010;
 - “(C) \$79,380,000 for fiscal year 2011;
 - “(D) \$83,350,000 for fiscal year 2012;
 - “(E) \$87,520,000 for fiscal year 2013; and
 - “(F) \$91,900,000 for fiscal year 2014.”.
- (2) in subsection (a)(2)—
 - (A) by striking “fiscal years 2003 through 2008—“ and inserting “fiscal years 2009 through 2014—“;
 - (B) by striking “biology and control of zebra mussels and other important aquatic” in subparagraph (A) and inserting “biology, prevention, and control of aquatic”; and (C) by striking “blooms, including Pfiesteria piscicida; and” in subparagraph (C) and inserting “blooms; and”;
- (3) in subsection (c)(1) by striking “rating under section 204(d)(3)(A)” and inserting “performance assessments”; and
- (4) by striking subsection (c)(2) and inserting the following: “(2) regional or national strategic investments authorized under section 204(b)(4);”.

33 USC 1251- Water Pollution Prevention and Control

Through the National Shellfish Indicator Program, authorizes the Secretary of Commerce, in cooperation with the Secretary of Health and Human Services and the Administrator of EPA, to establish and administer a 5-year national shellfish research program for the purpose of improving existing classification systems for shellfish growing waters using the latest technological advancements in microbiology and epidemiological methods.

33 USC 1321 - Oil and Hazardous Substances [Clean Water Act]

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Authorizes the recovery of damages to natural resources in the event of an oil spill in waters of the United States. This authority has been delegated to several Federal agencies, including the Department, pursuant to an Executive Order.

33 USC 1441 - Monitoring and Research Program [Marine Protection, Research and Sanctuaries Act]

Authorizes the Secretary of Commerce, in coordination with other agencies, to initiate a comprehensive and continuing program of monitoring and research regarding the effects of the dumping of material into ocean waters or other coastal waters where the tide ebbs and flows or into the Great Lakes or their connecting waters.

33 USC 1442 - Research Program Respecting Possible Long-range Effects of Pollution, Overfishing, and Man-induced Changes of Ocean Ecosystems

Authorizes the Secretary of Commerce, in consultation with other agencies, to ... “initiate a comprehensive and continuing program of research with respect to the possible long-range effects of pollution, overfishing, and man-induced changes of ocean ecosystems.”

33 USC 1443 - Regional Management Plans for Waste Disposal in Coastal Areas

Authorizes the Secretary of Commerce to assist the Environmental Protection Agency in assessing “the feasibility in coastal areas of regional management plans for the disposal of waste materials.”

33 USC 1444 - Annual Report

Requires the Secretary of Commerce to provide Congress with an annual report on the Department’s activities to monitor ocean dumping and research the long-range effects of pollution on ocean ecosystems.

33 USC 2706 - Natural Resources [NOAA Oil and Hazardous Substance Spill Cost Reimbursement]

“...the National Oceanic and Atmospheric Administration acts as trustee of said marine environment and/or resources, shall be deposited in the Damage Assessment and Restoration Revolving Fund ... for purposes of obligation and expenditure in fiscal year 1991 and thereafter, sums available in the Damage Assessment and Restoration Revolving Fund may be transferred, upon

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the approval of the Secretary ..., to the Operations, Research, and Facilities appropriation of the National Oceanic and Atmospheric Administration.”

33 USC 2801 et seq. - National Coastal Monitoring Act

“The purposes of this chapter are to -

- (1) establish a comprehensive national program for consistent monitoring of the Nation's coastal ecosystems;
- (2) establish long-term water quality assessment and monitoring programs for high priority coastal waters that will enhance the ability of Federal, State, and local authorities to develop and implement effective remedial programs for those waters;
- (3) establish a system for reviewing and evaluating the scientific, analytical, and technological means that are available for monitoring the environmental quality of coastal ecosystems;
- (4) establish methods for identifying uniform indicators of coastal ecosystem quality;
- (5) provide for periodic, comprehensive reports to Congress concerning the quality of the Nation's coastal ecosystems;
- (6) establish a coastal environment information program to distribute coastal monitoring information;
- (7) provide state programs authorized under the Coastal Zone Management Act of 1972 (16 U.S.C. 1451 et seq.) with information necessary to design land use plans and coastal zone regulations that will contribute to the protection of coastal ecosystems; and
- (8) provide certain water pollution control programs authorized under the Federal Water Pollution Control Act (33 U.S.C. 1251 et seq.) with information necessary to design and implement effective coastal water pollution controls.”

33 USC 3001 et seq.- NOAA Corps Officers

PL 108-219 states: “All action in the line of duty by, and all Federal agency actions in relation to (including with respect to pay, benefits, and retirement) a de facto officer of the commissioned corps of the National Oceanic and Atmospheric Administration who was appointed or promoted to that office without Presidential action, and without the advice and consent of the Senate, during such time as the officer was not properly appointed in or promoted to that office, are hereby ratified and approved if otherwise in accord with the law, and the President alone may, without regard to any other law relating to appointments or promotions in such corps, appoint or promote such a de facto officer temporarily, without change in the grade currently occupied in a de facto capacity, as an officer in such corps for a period ending not later than 180 days from the date of enactment of this Act.”

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33 USC 3044 et seq. -Retirement for Length of Service

PL 107-372 states: "An officer who has completed 20 years of service, of which at least 10 years was service as a commissioned officer, may at any time thereafter, upon application by such officer and in the discretion of the President, be placed on the retired list.

33 USC 3045 - Computation of Retired Pay

PL 107-372 states: " (a) Officers first becoming members before September 8, 1980: Each officer on the retired list who first became a member of a uniformed service before September 8, 1980, shall receive retired pay at the rate determined by multiplying (1) the retired pay base determined under section 1406(g) of title 10; by (2) 2 ½ percent of the number of years of service that may be credited to the officer under section 1405 of such title as if the officer's service were service as a member of the Armed Forces. The retired pay so computed may not exceed 75 percent of the retired pay base. (b) Officers first becoming members on or after September 8, 1980. Each officer on the retired list who first became a member of a uniformed service on or after September 8, 1980, shall receive retired pay at the rate determined by multiplying (1) the retired pay base determined under section 1407 of title 10; by (2) the retired pay multiplier determined under section 1409 of such title for the number of years of service that may be credited to the officer under section 1405 of such title as if the officer's service were service as a member of the Armed Forces. (c) Treatment of full and fractional parts of months in computing years of service (1) In general, in computing the number of years of service of an officer for the purposes of subsection (a) of this section - (A) each full month of service that is in addition to the number of full years of service creditable to the officer shall be credited as 1/12 of a year; and (B) any remaining fractional part of a month shall be disregarded. (2) Rounding Retired pay computed under this section, if not a multiple of \$1, shall be rounded to the next lower multiple of \$1."

33 USC 3046 - Retired Grade and Retired Pay

PL 107-372 states: "Each officer retired pursuant to law shall be placed on the retired list with the highest grade satisfactorily held by that officer while on active duty including active duty pursuant to recall, under permanent or temporary appointment, and shall receive retired pay based on such highest grade, if - (1) the officer's performance of duty in such highest grade has been satisfactory, as determined by the Secretary of the department or departments under whose jurisdiction the officer served; and (2) unless retired for disability, the officer's length of service in such highest grade is no less than that required by the Secretary of officers retiring under permanent appointment in that grade.

Department of Commerce
National Oceanic and Atmospheric Administration
APPROPRIATION LANGUAGE AND CODE CITATIONS

33 USC 4001 - Harmful Algal Bloom and Hypoxia Research and Control Amendments Act of 2014

The President, through the Committee on Environment and Natural Resources of the National Science and Technology Council, shall establish an Inter-Agency Task Force on Harmful Algal Blooms and Hypoxia. The Task Force shall consist of a representative from—the Department of Commerce (who shall serve as Chairman of the Task Force) among others.

Use of Oil Spill Liability Trust Fund

PL 111-281, Sec. 708 amends Section 1012(a)(5) of the Oil Spill Liability Trust Fund Act by: “(2) by inserting after subparagraph (A) the following:“(B) not more than \$15,000,000 in each fiscal year shall be available to the Under Secretary of Commerce for Oceans and Atmosphere for expenses incurred by, and activities related to, response and damage assessment capabilities of the National Oceanic and Atmospheric Administration.”

The Public Health and Welfare

42 USC 8902-8905 - Acid Precipitation Program

Authorized the Administrator of NOAA to serve as co-chair of a task force to prepare a comprehensive research plan for a program to study the causes and effects of acid precipitation. Also authorizes the Administrator of NOAA to serve as the director of a related research program.

42 USC 9601 et seq. (CERCLA)

Through associated regulations and delegations, authorizes the Administrator to provide technical assistance to the Administrator, EPA, for hazardous waste response under CERCLA and the National Contingency Plan and authorizes the Administrator to act as a natural resource trustee with authority to bring a cause of action for damages resulting from an injury to, destruction of or loss of resources under NOAA’s jurisdiction.

Department of Commerce
National Oceanic and Atmospheric Administration
APPROPRIATION LANGUAGE AND CODE CITATIONS

Public Lands

43 USC 1347e - Safety and Health Regulations

Authorizes the Secretary of Commerce in cooperation with other Federal entities, to conduct studies of underwater diving techniques and equipment “suitable for protection of human safety and improvement of diver performance....”

Public Printing and Documents

44 USC 1307 - Sale and Distribution of NOAA Nautical and Aeronautical Products

“All nautical and aeronautical products created or published ... shall be sold at ... prices ... the Secretary of Commerce shall establish annually ... so as to recover all costs attributable to data base management, compilation, printing, and distribution of such products.”

Transportation

49 USC 44720 - Meteorological services

The Administrator of the Federal Aviation Administration shall make recommendations to the Secretary of Commerce on providing meteorological services necessary for the safe and efficient movement of aircraft in air commerce. In providing the services, the Secretary shall cooperate with the Administrator and give complete consideration to those recommendations.

“To promote safety and efficiency in air navigation to the highest possible degree, the Secretary shall -(1)observe, measure, investigate, and study atmospheric phenomena, and maintain meteorological stations and offices...(2) provide reports to the Administrator (3)cooperate with persons engaged in air commerce in meteorological services...(4)maintain and coordinate international exchanges of meteorological information... (5) participate in developing an international basic meteorological reporting network...(6)coordinate meteorological requirements in the United States to maintain standard observations...;(7)promote and develop meteorological science....”

Department of Commerce
National Oceanic and Atmospheric Administration
APPROPRIATION LANGUAGE AND CODE CITATIONS

Interjurisdictional Fisheries Act

97 Stat. 1409

This Act authorizes NMFS fisheries programs not otherwise authorized by law, including research to reduce entanglement of marine mammals in fishing gear, development of habitat restoration techniques, restoration of Chesapeake Bay, and conservation of Antarctic living marine resources.

Omnibus Public Land Management Act of 2009

PL 111-11, Sec 12002

Establishes a national ocean exploration program within the National Oceanic and Atmospheric Administration (NOAA) that promotes collaboration with other federal ocean and undersea research and exploration programs. Requires convening an ocean exploration and undersea research technology and infrastructure task force. Establishes the Ocean Exploration Advisory Board. Authorizes appropriations.

PL 111-11, Sec 12202

Ocean and Coastal Mapping Integration Act - Directs the President to establish a coordinated federal program to develop an ocean and coastal mapping plan for the Great Lakes and coastal state waters, the territorial sea, the exclusive economic zone, and the continental shelf of the United States that enhances ecosystem approaches in decision-making for conservation and management of marine resources and habitats, establishes research and mapping priorities, supports the siting of research and other platforms, and advances ocean and coastal science. Requires a plan for an integrated ocean and coastal mapping initiative within NOAA. Authorizes appropriations.

PL 111-11, Sec 12304

Integrated Coastal and Ocean Observation System Act of 2009 - Directs the President to establish a National Integrated Coastal and Ocean Observation System that is designed to address regional and national needs for ocean information, to gather specific data on key coastal, ocean, and Great Lakes variables, and to ensure timely and sustained dissemination and availability of such data. Requires an advisory committee. Authorizes appropriations.

Department of Commerce
National Oceanic and Atmospheric Administration
APPROPRIATION LANGUAGE AND CODE CITATIONS

PL 111-11, Sec 12404

Federal Ocean Acidification Research And Monitoring Act of 2009 or the FOARAM Act - Directs the Joint Subcommittee on Ocean Science and Technology of the National Science and Technology Council to: (1) coordinate federal activities on ocean acidification and establish an interagency working group; and (2) develop a strategic plan for federal research and monitoring on ocean acidification. Requires specified ocean acidification programs in NOAA, the National Science Foundation (NSF), and the National Aeronautics and Space Administration (NASA). Authorizes appropriations.

PL 111-11, Sec 12502

Coastal and Estuarine Land Conservation Program Act - (Sec. 12502) Amends the Coastal Zone Management Act of 1972 to authorize the Secretary of Commerce to conduct a Coastal and Estuarine Land Conservation Program to protect important coastal and estuarine areas. Requires related property acquisition grants to coastal states with approved coastal zone management plans or National Estuarine Research Reserve units. Authorizes appropriations.

NATIONAL OCEAN SERVICE
(\$ in Thousands)

FY 2016 PROPOSED OPERATING PLAN	FY 2014			FY 2015			FY 2016	FY 2016			FY 2016			FY 2016			FY 2016
	Spend Plan	POS	FTE	Enacted	POS	FTE	Calculated	Technical	POS	FTE	Base	POS	FTE	Program	POS	FTE	President's
							ATBs	ATBs						Changes			Budget
Navigation, Observations and Positioning																	
Navigation, Observations and Positioning	135,789	570	542	137,961	0	0	3,039	0	570	542	141,000	0	0	0	570	542	141,000
Hydrographic Survey Priorities/Contracts	24,961	11	10	25,000	0	0	0	0	11	10	25,000	0	0	0	11	10	25,000
IOOS Regional Observations	28,456	0	0	29,500	0	0	0	0	0	0	29,500	0	0	0	0	0	29,500
Total, Navigation, Observations and Positioning	189,206	581	552	192,461	0	0	3,039	0	581	552	195,500	0	0	0	581	552	195,500
Coastal Science and Assessment																	
Coastal Science, Assessment, Response and Restoration	70,390	310	294	71,000	0	0	1,600	0	310	294	72,600	0	0	0	310	294	72,600
Competitive Research	8,986	3	3	9,000	0	0	0	0	3	3	9,000	0	0	4,000	3	3	13,000
Total, Coastal Science and Assessment	79,376	313	297	80,000	0	0	1,600	0	313	297	81,600	0	0	4,000	313	297	85,600
Ocean and Coastal Management and Services																	
Coastal Zone Management and Services	40,936	144	137	41,700	0	0	664	0	144	137	42,364	0	0	11,780	144	137	54,144
Coastal Management Grants	66,043	0	0	71,146	0	0	0	0	0	0	71,146	0	0	45,000	0	0	116,146
Coral Reef Program	25,960	24	23	26,000	0	0	100	0	24	23	26,100	0	0	0	24	23	26,100
National Estuarine Research Reserve System	21,267	0	0	21,300	0	0	0	0	0	0	21,300	0	0	0	0	0	21,300
Sanctuaries and Marine Protected Areas	48,425	195	186	48,500	0	0	1,161	0	195	186	49,661	0	0	(1,361)	195	186	48,300
Total, Ocean and Coastal Management and Services	202,631	363	346	208,646	0	0	1,925	0	363	346	210,571	0	0	55,419	363	346	265,990
Total, National Ocean Service - ORF	471,213	1,257	1,195	481,107	0	0	6,564	0	1,257	1,195	487,671	0	0	59,419	1,257	1,195	547,090
Other National Ocean Service Accounts																	
Total, National Ocean Service - PAC	3,694	5	5	3,700	0	0	0	0	5	5	3,700	0	0	0	5	5	3,700
Total, National Ocean Service - Other	23,259	16	16	50,931	0	0	0	(27,761)	16	16	23,170	0	0	0	16	16	23,170
GRAND TOTAL NOS	498,166	1,278	1,216	535,738	0	0	6,564	(27,761)	1,278	1,216	514,541	0	0	59,419	1,278	1,216	573,960

NATIONAL MARINE FISHERIES SERVICE
(\$ in Thousands)

FY 2016 PROPOSED OPERATING PLAN	FY 2014			FY 2015			FY 2016			FY 2016			FY 2016			FY 2016		
	Spend Plan	POS	FTE	Enacted	POS	FTE	Calculated ATBs	Technical ATBs	POS	FTE	Base	POS	FTE	Program Changes	POS	FTE	President's Budget	
Protected Resources Science and Management																		
Marine Mammals, Sea Turtles & Other Species	114,104	491	467	115,219	0	0	2,170	0	491	467	117,389	35	26	28,321	526	493	145,710	
ESA Salmon	64,400	361	344	65,500	0	0	1,700	0	361	344	67,200	0	0	1,301	361	344	68,501	
Total, Protected Resources Science and Management	178,504	852	811	180,719	0	0	3,870	0	852	811	184,589	35	26	29,622	887	837	214,211	
Fisheries Science and Management																		
Fisheries and Ecosystem Science Programs and Services	131,134	625	595	132,189	0	0	2,653	0	625	595	134,842	0	0	11,475	625	595	146,317	
Fisheries Data Collections, Surveys and Assessments	156,990	480	457	158,271	0	0	2,165	0	480	457	160,436	0	0	2,815	480	457	163,251	
Observers and Training	43,586	158	150	43,655	0	0	611	0	158	150	44,266	0	0	484	158	150	44,750	
Fisheries Management Programs and Services	120,548	487	464	120,458	0	0	2,243	0	487	464	122,701	0	0	5,666	487	464	128,367	
Salmon Management Activities	30,153	28	27	30,200	0	0	158	0	28	27	30,358	0	0	(2,896)	28	27	27,462	
Regional Councils and Fisheries Commissions	34,446	14	13	35,238	0	0	737	0	14	13	35,975	0	0	0	14	13	35,975	
Total, Fisheries Science and Management	516,857	1,792	1,706	520,011	0	0	8,567	0	1,792	1,706	528,578	0	0	17,544	1,792	1,706	546,122	
Enforcement																		
Enforcement	62,899	228	217	65,000	0	0	1,168	0	228	217	66,168	20	15	3,850	248	232	70,018	
Total, Enforcement	62,899	228	217	65,000	0	0	1,168	0	228	217	66,168	20	15	3,850	248	232	70,018	
Habitat Conservation & Restoration																		
Habitat Management and Restoration	51,037	160	154	56,408	0	0	806	0	160	154	57,214	16	12	671	176	166	57,885	
Subtotal, Habitat Conservation & Restoration	51,037	160	154	56,408	0	0	806	0	160	154	57,214	16	12	671	176	166	57,885	
Total, National Marine Fisheries Service - ORF	809,297	3,032	2,888	822,138	0	0	14,411	0	3,032	2,888	836,549	71	53	51,687	3,103	2,941	888,236	
Other National Marine Fisheries Service Accounts																		
Total, National Marine Fisheries Service - PAC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total, National Marine Fisheries Service - Other	193,476	40	40	136,056	0	0	0	(37,471)	40	40	98,585	0	0	3,300	40	40	101,885	
GRAND TOTAL NMFS	1,002,773	3,072	2,928	958,194	0	0	14,411	(37,471)	3,072	2,928	935,134	71	53	54,987	3,143	2,981	990,121	

OFFICE of OCEANIC AND ATMOSPHERIC RESEARCH
(\$ in Thousands)

FY 2016 PROPOSED OPERATING PLAN	FY 2014 Spend Plan	POS	FTE	FY 2015 Enacted	POS	FTE	FY 2016 Calculated ATBs	FY 2016 Technical ATBs	POS	FTE	FY 2016 Base	POS	FTE	FY 2016 Program Changes	POS	FTE	FY 2016 President's Budget
Climate Research																	
Laboratories & Cooperative Institutes																	
Laboratories & Cooperative Institutes	58,858	202	190	60,000	0	0	1,078	0	202	190	61,078	2	2	9,415	204	192	70,493
Subtotal, Laboratories & Cooperative Institutions	58,858	202	190	60,000	0	0	1,078	0	202	190	61,078	2	2	9,415	204	192	70,493
Regional Climate Data & Information																	
Regional Climate Data & Information	36,943	21	19	38,000	0	0	125	0	21	19	38,125	4	3	14,312	25	22	52,437
Subtotal, Regional Climate Data & Information	36,943	21	19	38,000	0	0	125	0	21	19	38,125	4	3	14,312	25	22	52,437
Climate Competitive Research																	
Climate Competitive Research	58,407	66	63	60,000	0	0	326	0	66	63	60,326	1	1	5,504	67	64	65,830
Subtotal, Climate Competitive Research	58,407	66	63	60,000	0	0	326	0	66	63	60,326	1	1	5,504	67	64	65,830
Total, Climate Research	154,208	289	272	158,000	0	0	1,529	0	289	272	159,529	7	6	29,231	296	278	188,760
Weather & Air Chemistry Research																	
Laboratories & Cooperative Institutes																	
Laboratories & Cooperative Institutes	63,900	217	207	70,000	9	9	1,202	884	226	216	72,086	2	2	(3,982)	228	218	68,104
Subtotal, Laboratories & Cooperative Institutes	63,900	217	207	70,000	9	9	1,202	884	226	216	72,086	2	2	(3,982)	228	218	68,104
Weather & Air Chemistry Research Programs																	
U.S. Weather Research Program (USWRP)	4,193	5	5	7,300	0	0	42	(200)	5	5	7,142	1	1	8,936	6	6	16,078
Tornado Severe Storm Research / Phased Array Radar	12,980	0	0	13,500	0	0	0	0	0	0	13,500	0	0	(342)	0	0	13,158
Subtotal, Weather & Air Chemistry Research Programs	17,173	5	5	20,800	0	0	42	(200)	5	5	20,642	1	1	8,594	6	6	29,236
Total, Weather & Air Chemistry Research	81,073	222	212	90,800	9	9	1,244	684	231	221	92,728	3	3	4,612	234	224	97,340
Ocean, Coastal, and Great Lakes Research																	
Laboratories & Cooperative Institutes																	
Laboratories & Cooperative Institutes	26,201	131	125	27,000	7	7	746	1,800	138	132	29,546	0	0	(2,531)	138	132	27,015
Subtotal, Laboratories & Cooperative Institutes	26,201	131	125	27,000	7	7	746	1,800	138	132	29,546	0	0	(2,531)	138	132	27,015

OFFICE of OCEANIC AND ATMOSPHERIC RESEARCH
(\$ in Thousands)

FY 2016 PROPOSED OPERATING PLAN	FY 2014 Spend Plan	POS	FTE	FY 2015 Enacted	POS	FTE	FY 2016 Calculated ATBs	FY 2016 Technical ATBs	POS	FTE	FY 2016 Base	POS	FTE	FY 2016 Program Changes	POS	FTE	FY 2016 President's Budget
National Sea Grant College Program																	
National Sea Grant College Program Base	62,702	14	13	62,800	0	0	83	0	14	13	62,883			(1,431)	14	13	61,452
Marine Aquaculture Program	4,493	1	1	4,500	0	0	0	0	1	1	4,500	0	0	2,500	1	1	7,000
Subtotal, National Sea Grant College Program	67,195	15	14	67,300	0	0	83	0	15	14	67,383	0	0	1,069	15	14	68,452
Ocean Exploration and Research																	
Ocean Exploration and Research	25,960	20	19	28,000	0	0	124	0	20	19	28,124	0	0	(8,780)	20	19	19,344
Subtotal, Ocean Exploration and Research	25,960	20	19	28,000	0	0	124	0	20	19	28,124	0	0	(8,780)	20	19	19,344
Other Ecosystems Programs																	
Integrated Ocean Acidification	5,991	14	12	8,500	0	0	83	0	14	12	8,583	6	4	21,422	20	16	30,005
Subtotal, Other Ecosystems Programs	5,991	14	12	8,500	0	0	83	0	14	12	8,583	6	4	21,422	20	16	30,005
Sustained Ocean Observations and Monitoring																	
Sustained Ocean Observations and Monitoring	40,936	49	47	41,300	0	0	296	0	49	47	41,596	0	0	0	49	47	41,596
Subtotal, Sustained Ocean Observations and Monitoring	40,936	49	47	41,300	0	0	296	0	49	47	41,596	0	0	0	49	47	41,596
Total, Ocean, Coastal, & Great Lakes Research	166,283	229	217	172,100	7	7	1,332	1,800	236	224	175,232	6	4	11,180	242	228	186,412
Innovative Research & Technology																	
High Performance Computing Initiatives	11,981	11	10	12,000	0	0	41	0	11	10	12,041	0	0	103	11	10	12,144
Total, Innovative Research & Technology	11,981	11	10	12,000	0	0	41	0	11	10	12,041	0	0	103	11	10	12,144
Total, Office of Oceanic and Atmospheric Research - ORF	413,545	751	711	432,900	16	16	4,146	2,484	767	727	439,530	16	13	45,126	783	740	484,656
Other Office of Oceanic and Atmospheric Research Accounts																	
Total, Office of Ocean and Atmospheric Research - PAC	10,363	0	0	13,379	0	0	0	0	0	0	13,379	0	0	9,000	0	0	22,379
Total, Office of Oceanic and Atmospheric Research - Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GRAND TOTAL OAR	423,908	751	711	446,279	16	16	4,146	2,484	767	727	452,909	16	13	54,126	783	740	507,035

NATIONAL WEATHER SERVICE
(\$ in Thousands)

FY 2016 PROPOSED OPERATING PLAN	FY 2014			FY 2015			FY 2016		FY 2016		FY 2016			FY 2016			
	Spend Plan	POS	FTE	Enacted	POS	FTE	Calculated ATBs	Technical ATBs	POS	FTE	Base	POS	FTE	Program Changes	POS	FTE	President's Budget
Observations	205,022	844	804	210,777	0	0	4,732	(3,000)	844	804	212,509	0	0	(7,633)	844	804	204,876
Central Processing	100,069	244	232	96,617	0	0	1,385	0	244	232	98,002	(98)	(98)	(10,100)	146	134	87,902
Analyze, Forecast and Support	474,729	3,163	3,010	483,060	0	0	10,485	0	3,163	3,010	493,545	0	0	(3,700)	3,163	3,010	489,845
Dissemination	46,259	86	82	40,099	0	0	644	6,000	86	82	46,743	0	0	0	86	82	46,743
Science and Technology Integration	123,066	514	488	123,600	0	0	2,097	0	514	488	125,697	0	0	8,500	514	488	134,197
Total, National Weather Service - ORF	949,145	4,851	4,616	954,153	0	0	19,343	3,000	4,851	4,616	976,496	(98)	(98)	(12,933)	4,753	4,518	963,563
Other National Weather Service Accounts																	
Total, National Weather Service - PAC	113,442	23	22	133,300	0	0	0	(3,000)	23	22	130,300	0	0	5,015	23	22	135,315
Total, National Weather Service - Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GRAND TOTAL NWS	1,062,587	4,874	4,638	1,087,453	0	0	19,343	0	4,874	4,638	1,106,796	(98)	(98)	(7,918)	4,776	4,540	1,098,878

NATIONAL ENVIRONMENTAL SATELLITE, DATA AND INFORMATION SERVICE
(\$ in Thousands)

FY 2016 PROPOSED OPERATING PLAN	FY 2014 Spend Plan	POS	FTE	FY 2015 Enacted	POS	FTE	FY 2016 Calculated ATBs	FY 2016 Technical ATBs	POS	FTE	FY 2016 Base	POS	FTE	FY 2016 Program Changes	POS	FTE	FY 2016 President's Budget
Environmental Satellite Observing Systems																	
Office of Satellite and Product Operations (OSPO)																	
Satellite and Product Operations	83,869	235	235	84,000	2	2	1,240	3,259	237	237	88,499	0	0	4,582	237	237	93,081
NSOF Operations	7,988	0	0	8,500	0	0	500	0	0	0	9,000	0	0	0	0	0	9,000
Subtotal, Office of Satellite and Product Operations (OSPO)	91,857	235	235	92,500	2	2	1,740	3,259	237	237	97,499	0	0	4,582	237	237	102,081
Product Development, Readiness & Application																	
Product Development, Readiness & Application	24,459	88	88	26,000	0	0	440	(124)	88	88	26,316	0	0	0	88	88	26,316
Subtotal, Product Development, Readiness & Application	24,459	88	88	26,000	0	0	440	(124)	88	88	26,316	0	0	0	88	88	26,316
Commercial Remote Sensing Regulatory Affairs	998	6	6	1,000	0	0	0	0	6	6	1,000	0	0	200	6	6	1,200
Office of Space Commercialization	599	4	4	600	0	0	0	0	4	4	600	0	0	400	4	4	1,000
Group on Earth Observations (GEO)	499	0	0	500	0	0	0	0	0	0	500	0	0	0	0	0	500
Total, Environmental Satellite Observing Systems	118,412	333	333	120,600	2	2	2,180	3,135	335	335	125,915	0	0	5,182	335	335	131,097
National Centers for Environmental Information																	
National Centers for Environmental Information	66,463	251	251	68,000	(9)	(9)	1,265	(11,085)	242	242	58,180	0	0	1,067	242	242	59,247
Total, National Centers for Environmental Information	66,463	251	251	68,000	(9)	(9)	1,265	(11,085)	242	242	58,180	0	0	1,067	242	242	59,247
Total, NESDIS - ORF	184,875	584	584	188,600	(7)	(7)	3,445	(7,950)	577	577	184,095	0	0	6,249	577	577	190,344
Other NESDIS Accounts																	
Total, NESDIS - PAC	1,902,219	302	301	2,034,544	0	1	0	6,150	302	302	2,040,694	8	6	148,589	310	308	2,189,283
Total, NESDIS - Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GRAND TOTAL NESDIS	2,087,094	886	885	2,223,144	(7)	(6)	3,445	(1,800)	879	879	2,224,789	8	6	154,838	887	885	2,379,627

PROGRAM SUPPORT
(\$ in Thousands)

FY 2016 PROPOSED OPERATING PLAN	FY 2014 Spend Plan	POS	FTE	FY 2015 Enacted	POS	FTE	FY 2016 Calculated ATBs	FY 2016 Technical ATBs	POS	FTE	FY 2016 Base	POS	FTE	FY 2016 Program Changes	POS	FTE	FY 2016 President's Budget
Corporate Services																	
Under Secretary and Associate Offices																	
Under Secretary and Associate Offices Base	26,958	147	140	27,000	0	0	188	0	147	140	27,188	0	0	0	147	140	27,188
Subtotal, Under Secretary and Associate Offices	26,958	147	140	27,000	0	0	188	0	147	140	27,188	0	0	0	147	140	27,188
NOAA Wide Corporate Services & Agency Management																	
NOAA Wide Corporate Services & Agency Management Base	110,828	686	651	112,000	(9)	(9)	3,316	(684)	677	642	114,632	15	11	4,341	692	653	118,973
DOC Accounting System	9,984	39	37	10,000	0	0	223	0	39	37	10,223	0	0	0	39	37	10,223
Payment to the DOC Working Capital Fund	46,204	0	0	40,000	0	0	7,731	22,091	0	0	69,822	0	0	0	0	0	69,822
Subtotal, NOAA Wide Corporate Services & Agency Management	167,016	725	688	162,000	(9)	(9)	11,270	21,407	716	679	194,677	15	11	4,341	731	690	199,018
IT Security																	
IT Security	8,287	0	0	8,300	0	0	0	0	0	0	8,300	0	0	0	0	0	8,300
Subtotal, IT Security	8,287	0	0	8,300	0	0	0	0	0	0	8,300	0	0	0	0	0	8,300
Total, Corporate Services	202,261	872	828	197,300	(9)	(9)	11,458	21,407	863	819	230,165	15	11	4,341	878	830	234,506
Office of Education																	
BWET Regional Programs	7,189	1	1	7,200	(1)	(1)	0	0	0	0	7,200	0	0	(7,200)	0	0	0
Education Partnership Program/Minority Serving Institutions (EPP/MSI)	14,378	12	11	14,400	(12)	(11)	0	(14,400)	0	0	0	0	0	0	0	0	0
Office of Education	5,591	12	11	6,000	13	12	31	14,400	25	23	20,431	0	0	(4,000)	25	23	16,431
Total, Office of Education	27,158	25	23	27,600	0	0	31	0	25	23	27,631	0	0	(11,200)	25	23	16,431
Facilities																	
NOAA Facilities Management & Construction and Safety	22,964	47	45	23,000	0	0	67	0	47	45	23,067	0	0	2,000	47	45	25,067
Subtotal, NOAA Facilities Management, Construction & Maintenance	22,964	47	45	23,000	0	0	67	0	47	45	23,067	0	0	2,000	47	45	25,067
Total, Facilities	22,964	47	45	23,000	0	0	67	0	47	45	23,067	0	0	2,000	47	45	25,067
Total, Program Support - ORF	252,383	944	896	247,900	(9)	(9)	11,556	21,407	935	887	280,863	15	11	(4,859)	950	898	276,004
Total, Program Support - PAC	0	0	0	0	0	0	0	0	0	0	0	0	0	1,000	0	0	1,000
Total, Program Support - ORF and PAC	252,383	944	896	247,900	(9)	(9)	11,556	21,407	935	887	280,863	15	11	(3,859)	950	898	277,004

PROGRAM SUPPORT
(\$ in Thousands)

FY 2016 PROPOSED OPERATING PLAN	FY 2014 Spend Plan	POS	FTE	FY 2015 Enacted	POS	FTE	FY 2016 Calculated ATBs	FY 2016 Technical ATBs	POS	FTE	FY 2016 Base	POS	FTE	FY 2016 Program Changes	POS	FTE	FY 2016 President's Budget
Marine Operations & Maintenance																	
Marine Operations & Maintenance	169,736	869	828	175,000	0	0	3,838	0	869	828	178,838	0	0	0	869	828	178,838
Total, Marine Operations & Maintenance	169,736	869	828	175,000	0	0	3,838	0	869	828	178,838	0	0	0	869	828	178,838
Aviation Operations																	
Aircraft Services	31,152	127	121	31,600	0	0	693	0	127	121	32,293	0	0	0	127	121	32,293
Total, Aviation Operations	31,152	127	121	31,600	0	0	693	0	127	121	32,293	0	0	0	127	121	32,293
<i>Total, OMAO - ORF</i>	<i>200,888</i>	<i>996</i>	<i>949</i>	<i>206,600</i>	<i>0</i>	<i>0</i>	<i>4,531</i>	<i>0</i>	<i>996</i>	<i>949</i>	<i>211,131</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>996</i>	<i>949</i>	<i>211,131</i>
<i>Total, OMAO - PAC</i>	<i>5,192</i>	<i>0</i>	<i>0</i>	<i>6,000</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>6,000</i>	<i>5</i>	<i>4</i>	<i>152,700</i>	<i>5</i>	<i>4</i>	<i>158,700</i>
<i>Total, OMAO - Other</i>	<i>30,205</i>	<i>0</i>	<i>0</i>	<i>30,205</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>30,205</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>30,205</i>
<i>Total, OMAO - ORF, PAC and Other</i>	<i>236,285</i>	<i>996</i>	<i>949</i>	<i>242,805</i>	<i>0</i>	<i>0</i>	<i>4,531</i>	<i>0</i>	<i>996</i>	<i>949</i>	<i>247,336</i>	<i>5</i>	<i>4</i>	<i>152,700</i>	<i>1,001</i>	<i>953</i>	<i>400,036</i>
Total, Program Support and OMAO - ORF	453,271	1,940	1,845	454,500	(9)	(9)	16,087	21,407	1,931	1,836	491,994	15	11	(4,859)	1,946	1,847	487,135
Other Program Support and OMAO Accounts																	
Total, Program Support - PAC	5,192	0	0	6,000	0	0	0	0	0	0	6,000	5	4	153,700	5	4	159,700
Total, Program Support - Other	30,205	0	0	30,205	0	0	0	0	0	0	30,205	0	0	0	0	0	30,205
GRAND TOTAL PS	488,668	1,940	1,845	490,705	(9)	(9)	16,087	21,407	1,931	1,836	528,199	20	15	148,841	1,951	1,851	677,040

ORF SUMMARY
LINE OFFICE DIRECT OBLIGATIONS
(\$ in Thousands)

FY 2016 PROPOSED OPERATING PLAN																		
	FY 2014 Spend Plan	POS	FTE	FY 2015 Enacted	POS	FTE	FY 2016 Calculated ATBs	FY 2016 Technical ATBs	POS	FTE	FY 2016 Base	POS	FTE	FY 2016 Program Changes	POS	FTE	FY 2016 President's Budget	
National Ocean Service	471,213	1,257	1,195	481,107	0	0	6,564	0	1,257	1,195	487,671	0	0	59,419	1,257	1,195	547,090	
National Marine Fisheries Service	809,297	3,032	2,888	822,138	0	0	14,411	0	3,032	2,888	836,549	71	53	51,687	3,103	2,941	888,236	
Office of Oceanic and Atmospheric Research	413,545	751	711	432,900	16	16	4,146	2,484	767	727	439,530	16	13	45,126	783	740	484,656	
National Weather Service	949,145	4,851	4,616	954,153	0	0	19,343	3,000	4,851	4,616	976,496	(98)	(98)	(12,933)	4,753	4,518	963,563	
National Environmental Satellite, Data and Information Service	184,875	584	584	188,600	(7)	(7)	3,445	(7,950)	577	577	184,095	0	0	6,249	577	577	190,344	
Program Support	453,271	1,940	1,845	454,500	(9)	(9)	16,087	21,407	1,931	1,836	491,994	15	11	(4,859)	1,946	1,847	487,135	
SUBTOTAL LO DIRECT OBLIGATIONS	3,281,346	12,415	11,839	3,333,398	0	0	63,996	18,941	12,415	11,839	3,416,335	4	(21)	144,689	12,419	11,818	3,561,024	

ORF ADJUSTMENTS
(\$ in Thousands)

FY 2016 PROPOSED OPERATING PLAN	FY 2014			FY 2015			FY 2016			FY 2016			FY 2016			FY 2016		
	Spend Plan	POS	FTE	Enacted	POS	FTE	Calculated ATBs	Technical ATBs	POS	FTE	Base	POS	FTE	Program Changes	POS	FTE	President's Budget	
SUBTOTAL LO DIRECT OBLIGATIONS	3,281,346	12,415	11,839	3,333,398	0	0	63,996	18,941	12,415	11,839	3,416,335	4	(21)	144,689	12,419	11,818	3,561,024	
FINANCING																		
De-Obligations	(15,000)	0	0	(15,000)	0	0	0	(2,500)	0	0	(17,500)	0	0	0	0	0	(17,500)	
Unobligated Balance, SOY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Rescission	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total ORF Financing	(15,000)	0	0	(15,000)	0	0	0	(2,500)	0	0	(17,500)	0	0	0	0	0	(17,500)	
SUBTOTAL BUDGET AUTHORITY	3,266,346	12,415	11,839	3,318,398	0	0	63,996	16,441	12,415	11,839	3,398,835	4	(21)	144,689	12,419	11,818	3,543,524	
TRANSFERS																		
Transfer from ORF to PAC	6,046	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Transfer from P&D to ORF	(115,000)	0	0	(116,000)	0	0	0	(14,164)	0	0	(130,164)	0	0	0	0	0	(130,164)	
Total ORF Transfers	(108,954)	0	0	(116,000)	0	0	0	(14,164)	0	0	(130,164)	0	0	0	0	0	(130,164)	
SUBTOTAL APPROPRIATION	3,157,392	12,415	11,839	3,202,398	0	0	63,996	2,277	12,415	11,839	3,268,671	4	(21)	144,689	12,419	11,818	3,413,360	

PROCUREMENT, ACQUISITION, AND CONSTRUCTION
(\$ in Thousands)

FY 2016 PROPOSED OPERATING PLAN	FY 2014			FY 2015			FY 2016		FY 2016		FY 2016			FY 2016			
	Spend Plan	POS	FTE	Enacted	POS	FTE	Calculated ATBs	Technical ATBs	POS	FTE	Base	POS	FTE	Program Changes	POS	FTE	President's Budget
NOS																	
NERRS Construction																	
National Estuarine Research Reserve Construction (NERRS)	1,697	2	2	1,700	0	0	0	0	2	2	1,700	0	0	0	2	2	1,700
Subtotal, NERRS Construction	1,697	2	2	1,700	0	0	0	0	2	2	1,700	0	0	0	2	2	1,700
Marine Sanctuaries Construction																	
Marine Sanctuaries Base	1,997	3	3	2,000	0	0	0	0	3	3	2,000	0	0	0	3	3	2,000
Subtotal, Marine Sanctuary Construction	1,997	3	3	2,000	0	0	0	0	3	3	2,000	0	0	0	3	3	2,000
Subtotal, NOS Construction	3,694	5	5	3,700	0	0	0	0	5	5	3,700	0	0	0	5	5	3,700
Total, NOS - PAC	3,694	5	5	3,700	0	0	0	0	5	5	3,700	0	0	0	5	5	3,700
Total, NMFS - PAC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OAR																	
Systems Acquisition																	
Research Supercomputing/ CCRI	10,363	0	0	13,379	0	0	0	0	0	0	13,379	0	0	9,000	0	0	22,379
Subtotal, OAR Systems Acquisition	10,363	0	0	13,379	0	0	0	0	0	0	13,379	0	0	9,000	0	0	22,379
Total, OAR - PAC	10,363	0	0	13,379	0	0	0	0	0	0	13,379	0	0	9,000	0	0	22,379
NWS																	
Systems Acquisition																	
Observations	5,640	0	0	12,300	0	0	0	(3,000)	0	0	9,300	0	0	7,420	0	0	16,720
Central Processing	65,658	23	22	64,000	0	0	0	0	23	22	64,000	0	0	261	23	22	64,261
Dissemination	34,156	0	0	45,000	0	0	0	0	0	0	45,000	0	0	684	0	0	45,684
Subtotal, NWS Systems Acquisition	105,454	23	22	121,300	0	0	0	(3,000)	23	22	118,300	0	0	8,365	23	22	126,665
Construction																	
Facilities Construction and Major Repairs	7,988	0	0	12,000	0	0	0	0	0	0	12,000	0	0	(3,350)	0	0	8,650
Subtotal, NWS Construction	7,988	0	0	12,000	0	0	0	0	0	0	12,000	0	0	(3,350)	0	0	8,650
Total, NWS - PAC	113,442	23	22	133,300	0	0	0	(3,000)	23	22	130,300	0	0	5,015	23	22	135,315

PROCUREMENT, ACQUISITION, AND CONSTRUCTION
(\$ in Thousands)

FY 2016 PROPOSED OPERATING PLAN	FY 2014			FY 2015			FY 2016		FY 2016		FY 2016			FY 2016		FY 2016	
	Spend Plan	POS	FTE	Enacted	POS	FTE	Calculated ATBs	Technical ATBs	POS	FTE	Base	POS	FTE	Program Changes	POS	FTE	President's Budget
NESDIS																	
Systems Acquisition																	
Geostationary Systems - R	940,416	63	63	980,838	0	0	0	0	63	63	980,838	0	0	(109,047)	63	63	871,791
Jason-3	35,171	3	3	23,175	0	0	0	0	3	3	23,175	0	0	(15,717)	3	3	7,458
Joint Polar Satellite System (JPSS)	819,575	97	97	916,267	0	0	0	0	97	97	916,267	0	0	(107,301)	97	97	808,966
Polar Follow-on	0	0	0	0	0	0	0	0	0	0	0	8	6	380,000	8	6	380,000
Solar Irradiance, Data and Rescue (SIDAR)	0	3	2	7,300	(3)	(2)	0	0	0	0	7,300	0	0	(6,800)	0	0	500
DSCOVR	23,638	4	4	21,100	0	0	0	0	4	4	21,100	0	0	(17,900)	4	4	3,200
Space Weather Follow-on	0	0	0	0	0	0	0	0	0	0	0	0	0	2,500	0	0	2,500
COSMIC 2/GNSS RO	1,997	1	1	6,800	0	0	0	0	1	1	6,800	0	0	13,200	1	1	20,000
Satellite Ground Services	49,708	84	84	50,000	0	0	0	5,808	84	84	55,808	0	0	2,717	84	84	58,525
System Architecture and Advanced Planning	4,587	14	14	3,000	0	0	0	342	14	14	3,342	0	0	1,587	14	14	4,929
Projects, Planning and Analysis	26,402	33	33	25,200	3	3	0	0	36	36	25,200	0	0	5,288	36	36	30,488
Subtotal, NESDIS Systems Acquisition	1,901,494	302	301	2,033,680	0	1	0	6,150	302	302	2,039,830	8	6	148,527	310	308	2,188,357
Construction																	
Satellite CDA Facility	1,725	0	0	2,166	0	0	0	0	0	0	2,166	0	0	62	0	0	2,228
Subtotal, NESDIS Construction	1,725	0	0	2,166	0	0	0	0	0	0	2,166	0	0	62	0	0	2,228
Transfer to OIG	(1,000)	0	0	(1,302)	0	0	0	0	0	0	(1,302)	0	0	0	0	0	(1,302)
Total, NESDIS - PAC	1,902,219	302	301	2,034,544	0	1	0	6,150	302	302	2,040,694	8	6	148,589	310	308	2,189,283
Program Support																	
Construction																	
NOAA Construction	0	0	0	0	0	0	0	0	0	0	0	0	0	1,000	0	0	1,000
Subtotal, Construction	0	0	0	0	0	0	0	0	0	0	0	0	0	1,000	0	0	1,000
Total, Program Support - PAC	0	0	0	0	0	0	0	0	0	0	0	0	0	1,000	0	0	1,000
OMAO																	
OMAO - Fleet Replacement																	
Fleet Capital Improvements & Tech Infusion (Vessel Equip & Tech Refresh)	5,192	0	0	6,000	0	0	0	0	0	0	6,000	0	0	5,700	0	0	11,700
New Vessel Construction	0	0	0	0	0	0	0	0	0	0	0	5	4	147,000	5	4	147,000
Subtotal, OMAO Fleet Replacement	5,192	0	0	6,000	0	0	0	0	0	0	6,000	5	4	152,700	5	4	158,700
Total, OMAO - PAC	5,192	0	0	6,000	0	0	0	0	0	0	6,000	5	4	152,700	5	4	158,700
GRAND TOTAL PAC	2,034,910	330	328	2,190,923	0	1	0	3,150	330	329	2,194,073	13	10	316,304	343	339	2,510,377

PAC ADJUSTMENTS
(\$ in Thousands)

FY 2016 PROPOSED OPERATING PLAN	FY 2014			FY 2015			FY 2016			FY 2016			FY 2016			FY 2016		
	Spend Plan	POS	FTE	Enacted	POS	FTE	Calculated ATBs	Technical ATBs	POS	FTE	Base	POS	FTE	Program Changes	POS	FTE	President's Budget	
SUBTOTAL DIRECT OBLIGATIONS	2,034,910	330	328	2,190,923	0	1	0	3,150	330	329	2,194,073	13	10	316,304	343	339	2,510,377	
FINANCING																		
Deobligations	(7,000)	0	0	(13,000)	0	0	0	0	0	0	(13,000)	0	0	0	0	0	(13,000)	
Unobligated Balance Adj. SOY (start of year)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Unobligated Balance End of Year	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total PAC Financing	(7,000)	0	0	(13,000)	0	0	0	0	0	0	(13,000)	0	0	0	0	0	(13,000)	
SUBTOTAL BUDGET AUTHORITY	2,027,910	330	328	2,177,923	0	1	0	3,150	330	329	2,181,073	13	10	316,304	343	339	2,497,377	
TRANSFERS																		
Transfer from ORF to PAC	(6,046)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Transfer to OIG	1,000	0	0	1,302	0	0	0	0	0	0	1,302	0	0	0	0	0	1,302	
Total PAC Transfers/Rescissions	(5,046)	0	0	1,302	0	0	0	0	0	0	1,302	0	0	0	0	0	1,302	
SUBTOTAL APPROPRIATION	2,022,864	330	328	2,179,225	0	1	0	3,150	330	329	2,182,375	13	10	316,304	343	339	2,498,679	

OTHER ACCOUNTS (DISCRETIONARY)
(\$ in Thousands)

FY 2016 PROPOSED OPERATING PLAN	FY 2014			FY 2015			FY 2016		FY 2016		FY 2016			FY 2016			
	Spend Plan	POS	FTE	Enacted	POS	FTE	Calculated ATBs	Technical ATBs	POS	FTE	Base	POS	FTE	Program Changes	POS	FTE	President's Budget
NMFS																	
Fishermen's Contingency Fund Obligations	350	0	0	350	0	0	0	0	0	0	350	0	0	0	0	0	350
Fishermen's Contingency Fund Budget Authority	350	0	0	350	0	0	0	0	0	0	350	0	0	0	0	0	350
Fishermen's Contingency Fund Appropriations	350	0	0	350	0	0	0	0	0	0	350	0	0	0	0	0	350
Foreign Fishing Observer Fund Obligations	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Foreign Fishing Observer Fund Budget Authority	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Foreign Fishing Observer Fund Appropriation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fisheries Finance Program Account Obligations	0	0	0	0	0	0	0	0	0	0	0	0	0	10,300	0	0	10,300
Fisheries Finance Program Account Budget Authority	0	0	0	0	0	0	0	0	0	0	0	0	0	10,300	0	0	10,300
Fisheries Finance Program Account Appropriation	0	0	0	0	0	0	0	0	0	0	0	0	0	10,300	0	0	10,300
Promote and Develop Fisheries Obligations	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Promote and Develop Fisheries Budget Authority	(115,000)	0	0	(116,000)	0	0	0	(14,164)	0	0	(130,164)	0	0	0	0	0	(130,164)
Promote and Develop Fisheries Appropriation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pacific Coastal Salmon Fund Obligations	65,000	2	2	65,000	0	0	0	0	2	2	65,000	0	0	(7,000)	2	2	58,000
Pacific Coastal Salmon Fund Budget Authority	65,000	2	2	65,000	0	0	0	0	2	2	65,000	0	0	(7,000)	2	2	58,000
Pacific Coastal Salmon Fund Appropriation	65,000	2	2	65,000	0	0	0	0	2	2	65,000	0	0	(7,000)	2	2	58,000
Marine Mammal Unusual Mortality Event Fund Obligations	0	0	0	0	0	0	0	50	0	0	50	0	0	0	0	0	50
Marine Mammal Unusual Mortality Event Fund Budget Authority	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marine Mammal Unusual Mortality Event Fund Appropriation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fisheries Disaster Assistance Fund Obligations	75,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fisheries Disaster Assistance Fund Budget Authority	75,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fisheries Disaster Assistance Fund Appropriation	75,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal, NMFS Other Discretionary Direct Obligation	140,350	2	2	65,350	0	0	0	50	2	2	65,400	0	0	3,300	2	2	68,700
Subtotal, NMFS Other Discretionary Budget Authority	25,350	2	2	(50,650)	0	0	0	(14,164)	2	2	(64,814)	0	0	3,300	2	2	(61,514)
Subtotal, NMFS Other Discretionary Appropriation	140,350	2	2	65,350	0	0	0	0	2	2	65,350	0	0	3,300	2	2	68,650
OMAO																	
Medicare Eligible Retiree Healthcare Fund Acct Obligations	1,936	0	0	1,936	0	0	0	0	0	0	1,936	0	0	0	0	0	1,936
Medicare Eligible Retiree Healthcare Fund Acct Budget Authority	1,936	0	0	1,936	0	0	0	0	0	0	1,936	0	0	0	0	0	1,936
Medicare Eligible Retiree Healthcare Fund Acct Appropriations	1,936	0	0	1,936	0	0	0	0	0	0	1,936	0	0	0	0	0	1,936
Subtotal, OMAO Other Discretionary Direct Obligations	1,936	0	0	1,936	0	0	0	0	0	0	1,936	0	0	0	0	0	1,936
Subtotal, OMAO Other Discretionary Budget Authority	1,936	0	0	1,936	0	0	0	0	0	0	1,936	0	0	0	0	0	1,936
Subtotal, OMAO Other Discretionary Appropriation	1,936	0	0	1,936	0	0	0	0	0	0	1,936	0	0	0	0	0	1,936
TOTAL, OTHER DISCRETIONARY DIRECT OBLIGATIONS	142,286	2	2	67,286	0	0	0	50	2	2	67,336	0	0	3,300	2	2	70,636
TOTAL, OTHER DISCRETIONARY BUDGET AUTHORITY	27,286	2	2	(48,714)	0	0	0	(14,164)	2	2	(62,878)	0	0	3,300	2	2	(59,578)
TOTAL, OTHER DISCRETIONARY APPROPRIATION	142,286	2	2	67,286	0	0	0	0	2	2	67,286	0	0	3,300	2	2	70,586

GRAND TOTAL SUMMARY
Discretionary Appropriations
(\$ in Thousands)

FY 2016 PROPOSED OPERATING PLAN	FY 2014			FY 2015			FY 2016		FY 2016		FY 2016			FY 2016		FY 2016	
	Spend Plan	POS	FTE	Enacted	POS	FTE	Calculated ATBs	Technical ATBs	POS	FTE	Base	POS	FTE	Program Changes	POS	FTE	President's Budget
Operations, Research and Facilities	3,157,392	12,415	11,839	3,202,398	0	0	63,996	2,277	12,415	11,839	3,268,671	4	(21)	144,689	12,419	11,818	3,413,360
Procurement, Acquisition and Construction	2,022,864	330	328	2,179,225	0	1	0	3,150	330	329	2,182,375	13	10	316,304	343	339	2,498,679
Coastal Zone Management Fund	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fisherman's Contingency Fund	350	0	0	350	0	0	0	0	0	0	350	0	0	0	0	0	350
Foreign Fishing Observer Fund	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fisheries Financing Program Account	0	0	0	0	0	0	0	0	0	0	0	0	0	10,300	0	0	10,300
Pacific Coastal Salmon Fund	65,000	2	2	65,000	0	0	0	0	2	2	65,000	0	0	(7,000)	2	2	58,000
Fisheries Disaster Assistance Fund	75,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marine Mammal Unusual Mortality Event Fund	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Medicare Eligible Retiree Health Care Fund	1,936	0	0	1,936	0	0	0	0	0	0	1,936	0	0	0	0	0	1,936
GRAND TOTAL DISCRETIONARY APPROPRIATION	5,322,542	12,747	12,169	5,448,909	0	1	63,996	5,427	12,747	12,170	5,518,332	17	(11)	464,293	12,764	12,159	5,982,625

SUMMARY OF DISCRETIONARY RESOURCES
(\$ in Thousands)

FY 2016 PROPOSED OPERATING PLAN	FY 2014			FY 2015			FY 2016 Calculated			FY 2016 Technical			FY 2016 Base			FY 2016 Program Changes			FY 2016 President's Budget		
	Spend Plan	POS	FTE	Enacted	POS	FTE	ATBs	ATBs	POS	FTE	Base	POS	FTE	Changes	POS	FTE	Budget				
<u>Discretionary Direct Obligations</u>																					
ORF Direct Obligations	3,281,346	12,415	11,839	3,333,398	0	0	63,996	18,941	12,415	11,839	3,416,335	4	(21)	144,689	12,419	11,818	3,561,024				
PAC Direct Obligations	2,034,910	330	328	2,190,923	0	1	0	3,150	330	329	2,194,073	13	10	316,304	343	339	2,510,377				
OTHER Direct Obligations	142,286	2	2	67,286	0	0	0	50	2	2	67,336	0	0	3,300	2	2	70,636				
TOTAL Discretionary Direct Obligations	5,458,542	12,747	12,169	5,591,607	0	1	63,996	22,141	12,747	12,170	5,677,744	17	(11)	464,293	12,764	12,159	6,142,037				
<u>Discretionary Budget Authority</u>																					
ORF Budget Authority	3,266,346	12,415	11,839	3,318,398	0	0	63,996	16,441	12,415	11,839	3,398,835	4	(21)	144,689	12,419	11,818	3,543,524				
PAC Budget Authority	2,027,910	330	328	2,177,923	0	1	0	3,150	330	329	2,181,073	13	10	316,304	343	339	2,497,377				
OTHER Budget Authority	27,286	2	2	(48,714)	0	0	0	(14,164)	2	2	(62,878)	0	0	3,300	2	2	(59,578)				
TOTAL Discretionary Budget Authority	5,321,542	12,747	12,169	5,447,607	0	1	63,996	5,427	12,747	12,170	5,517,030	17	(11)	464,293	12,764	12,159	5,981,323				
<u>Discretionary Appropriations</u>																					
ORF Appropriations	3,157,392	12,415	11,839	3,202,398	0	0	63,996	2,277	12,415	11,839	3,268,671	4	(21)	144,689	12,419	11,818	3,413,360				
PAC Appropriations	2,022,864	330	328	2,179,225	0	1	0	3,150	330	329	2,182,375	13	10	316,304	343	339	2,498,679				
OTHER Appropriations	142,286	2	2	67,286	0	0	0	0	2	2	67,286	0	0	3,300	2	2	70,586				
TOTAL Discretionary Appropriation	5,322,542	12,747	12,169	5,448,909	0	1	63,996	5,427	12,747	12,170	5,518,332	17	(11)	464,293	12,764	12,159	5,982,625				

OTHER ACCOUNTS (MANDATORY)
(\$ in Thousands)

FY 2016 PROPOSED OPERATING PLAN	FY 2014			FY 2015			FY 2016			FY 2016			FY 2016			FY 2016		
	Spend Plan	POS	FTE	Enacted	POS	FTE	Calculated ATBs	Technical ATBs	POS	FTE	Base	POS	FTE	Program Changes	POS	FTE	President's Budget	
NOS																		
Damage Assessment & Restoration Revolving Fund Obligations	20,633	16	16	48,611	0	0	0	(27,643)	16	16	20,968	0	0	0	16	16	20,968	
Damage Assessment & Restoration Revolving Fund Budget Authority	5,424	16	16	6,170	0	0	0	(202)	16	16	5,968	0	0	0	16	16	5,968	
Damage Assessment & Restoration Revolving Fund Appropriation	0	16	16	0	0	0	0	0	16	16	0	0	0	0	16	16	0	
Sanctuaries Enforcement Asset Forfeiture Fund Obligations	929	0	0	242	0	0	0	(118)	0	0	124	0	0	0	0	0	124	
Sanctuaries Enforcement Asset Forfeiture Fund Budget Authority	928	0	0	242	0	0	0	(118)	0	0	124	0	0	0	0	0	124	
Sanctuaries Enforcement Asset Forfeiture Fund Appropriation	1,000	0	0	183	0	0	0	(63)	0	0	120	0	0	0	0	0	120	
Gulf Coast Ecosystem Restoration Fund Obligations	1,697	0	0	2,078	0	0	0	0	0	0	2,078	0	0	0	0	0	2,078	
Gulf Coast Ecosystem Restoration Fund Budget Authority	1,697	0	0	2,078	0	0	0	0	0	0	2,078	0	0	0	0	0	2,078	
Gulf Coast Ecosystem Restoration Fund Appropriation	1,819	0	0	2,078	0	0	0	0	0	0	2,078	0	0	0	0	0	2,078	
Subtotal, NOS Other Mandatory Direct Obligations	23,259	16	16	50,931	0	0	0	(27,761)	16	16	23,170	0	0	0	16	16	23,170	
Subtotal, NOS Other Mandatory Budget Authority	8,049	16	16	8,490	0	0	0	(320)	16	16	8,170	0	0	0	16	16	8,170	
Subtotal, NOS Other Mandatory Appropriation	2,819	16	16	2,261	0	0	0	(63)	16	16	2,198	0	0	0	16	16	2,198	
NMFS																		
Promote and Develop Fisheries Obligations	12,187	0	0	26,615	0	0	0	(13,041)	0	0	13,574	0	0	0	0	0	13,574	
Promote and Develop Fisheries Budget Authority	120,774	0	0	142,615	0	0	0	1,123	0	0	143,738	0	0	0	0	0	143,738	
Promote and Develop Fisheries Appropriation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Fisheries Finance Program Account Obligations	14,629	0	0	22,757	0	0	0	(22,757)	0	0	0	0	0	0	0	0	0	
Fisheries Finance Program Account Budget Authority	14,629	0	0	22,757	0	0	0	(22,757)	0	0	0	0	0	0	0	0	0	
Fisheries Finance Program Account Appropriation	14,629	0	0	22,757	0	0	0	(22,757)	0	0	0	0	0	0	0	0	0	
Federal Ship Financing Obligations	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Federal Ship Financing Budget Authority	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Federal Ship Financing Appropriation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Environmental Improve & Restoration Fund Obligations	9,087	0	0	1,311	0	0	0	(977)	0	0	334	0	0	0	0	0	334	
Environmental Improve & Restoration Fund Budget Authority	9,087	0	0	1,311	0	0	0	1,910	0	0	3,221	0	0	0	0	0	3,221	
Environmental Improve & Restoration Fund Appropriation	9,792	0	0	1,414	0	0	0	2,057	0	0	3,471	0	0	0	0	0	3,471	
Limited Access System Administration Fund Obligations	9,338	38	38	10,893	0	0	0	632	38	38	11,525	0	0	0	38	38	11,525	
Limited Access System Administration Fund Budget Authority	8,998	38	38	11,710	0	0	0	(1,437)	38	38	10,273	0	0	0	38	38	10,273	
Limited Access System Administration Fund Appropriation	9,718	38	38	11,855	0	0	0	(1,706)	38	38	10,149	0	0	0	38	38	10,149	

OTHER ACCOUNTS (MANDATORY)
(\$ in Thousands)

FY 2016 PROPOSED OPERATING PLAN	FY 2014			FY 2015			FY 2016	FY 2016			FY 2016			FY 2016			FY 2016
	Spend Plan	POS	FTE	Enacted	POS	FTE	Calculated ATBs	Technical ATBs	POS	FTE	Base	POS	FTE	Program Changes	POS	FTE	President's Budget
Western Pacific Sustainable Fisheries Fund Obligations	218	0	0	322	0	0	0	(72)	0	0	250	0	0	0	0	0	250
Western Pacific Sustainable Fisheries Fund Budget Authority	160	0	0	322	0	0	0	(72)	0	0	250	0	0	0	0	0	250
Western Pacific Sustainable Fisheries Fund Appropriation	250	0	0	250	0	0	0	0	0	0	250	0	0	0	0	0	250
Fisheries Enforcement Asset Forfeiture Fund Obligations	3,769	0	0	4,052	0	0	0	(52)	0	0	4,000	0	0	0	0	0	4,000
Fisheries Enforcement Asset Forfeiture Fund Budget Authority	3,712	0	0	4,068	0	0	0	(68)	0	0	4,000	0	0	0	0	0	4,000
Fisheries Enforcement Asset Forfeiture Fund Appropriation	4,000	0	0	4,000	0	0	0	0	0	0	4,000	0	0	0	0	0	4,000
North Pacific Observer Fund Obligations	3,898	0	0	4,756	0	0	0	(1,254)	0	0	3,502	0	0	0	0	0	3,502
North Pacific Observer Fund Budget Authority	3,898	0	0	4,756	0	0	0	(1,254)	0	0	3,502	0	0	0	0	0	3,502
North Pacific Observer Fund Appropriation	4,200	0	0	4,800	0	0	0	(1,400)	0	0	3,400	0	0	0	0	0	3,400
Subtotal, NMFS Other Mandatory Direct Obligations	53,126	38	38	70,706	0	0	0	(37,521)	38	38	33,185	0	0	0	38	38	33,185
Subtotal, NMFS Other Mandatory Budget Authority	161,258	38	38	187,539	0	0	0	(22,555)	38	38	164,984	0	0	0	38	38	164,984
Subtotal, NMFS Other Mandatory Appropriation	42,589	38	38	45,076	0	0	0	(23,806)	38	38	21,270	0	0	0	38	38	21,270
OMAO																	
NOAA Corp Commissioned Officers Retirement Obligations	28,269	0	0	28,269	0	0	0	0	0	0	28,269	0	0	0	0	0	28,269
NOAA Corp Commissioned Officers Retirement Budget Authority	28,269	0	0	28,269	0	0	0	0	0	0	28,269	0	0	0	0	0	28,269
NOAA Corp Commissioned Officers Retirement Budget Appropriation	28,269	0	0	28,269	0	0	0	0	0	0	28,269	0	0	0	0	0	28,269
Subtotal, OMAO Other Mandatory Direct Obligations	28,269	0	0	28,269	0	0	0	0	0	0	28,269	0	0	0	0	0	28,269
Subtotal, OMAO Other Mandatory Budget Authority	28,269	0	0	28,269	0	0	0	0	0	0	28,269	0	0	0	0	0	28,269
Subtotal, OMAO Other Mandatory Appropriation	28,269	0	0	28,269	0	0	0	0	0	0	28,269	0	0	0	0	0	28,269
TOTAL, OTHER MANDATORY DIRECT OBLIGATIONS	104,654	54	54	149,906	0	0	0	(65,282)	54	54	84,624	0	0	0	54	54	84,624
TOTAL, OTHER MANDATORY BUDGET AUTHORITY	197,576	54	54	224,298	0	0	0	(22,875)	54	54	201,423	0	0	0	54	54	201,423
TOTAL, OTHER MANDATORY APPROPRIATION	73,677	54	54	75,606	0	0	0	(23,869)	54	54	51,737	0	0	0	54	54	51,737

*Obligations and Budget Authority for mandatory accounts have been updated in FY14 to reflect the Popup of FY13 sequestered funds and in FY15 to reflect FY15 sequestration and the Popup of FY14 sequestered funds.

NOAA SUMMARY
(\$ in Thousands)

FY 2016 PROPOSED OPERATING PLAN							FY 2016		FY 2016					FY 2016		FY 2016	
	FY 2014 Spend Plan	POS	FTE	FY 2015 Enacted	POS	FTE	Calculated ATBs	Technical ATBs	POS	FTE	FY 2016 Base	POS	FTE	FY 2016 Program Changes	POS	FTE	President's Budget
TOTAL Direct Obligations (Discretionary & Mandatory)	5,563,196	12,801	12,223	5,741,513	0	1	63,996	(43,141)	12,801	12,224	5,762,368	17	(11)	464,293	12,818	12,213	6,226,661
TOTAL Budget Authority (Discretionary & Mandatory)	5,519,118	12,801	12,223	5,671,905	0	1	63,996	(17,448)	12,801	12,224	5,718,453	17	(11)	464,293	12,818	12,213	6,182,746
TOTAL Appropriation (Discretionary & Mandatory)	5,396,219	12,801	12,223	5,524,515	0	1	63,996	(18,442)	12,801	12,224	5,570,069	17	(11)	464,293	12,818	12,213	6,034,362
Reimbursable Financing	416,687	706	706	406,969	0	0	0	(164,969)	706	706	242,000	0	0	0	706	706	242,000
TOTAL OBLIGATIONS (Direct & Reimbursable)	5,979,883	13,507	12,929	6,148,482	0	1	63,996	(208,110)	13,507	12,930	6,004,368	17	(11)	464,293	13,524	12,919	6,468,661
Offsetting Receipts	(6,000)	0	0	(5,439)	0	0	0	1,604	0	0	(3,835)	0	0	0	0	0	(3,835)
TOTAL OBLIGATIONS (Direct, Reimbursable & Offsetting Receipts)	5,973,883	13,507	12,929	6,143,043	0	1	63,996	(206,506)	13,507	12,930	6,000,533	17	(11)	464,293	13,524	12,919	6,464,826

LINE OFFICE SUMMARY
(\$ in Thousands)

FY 2016 PROPOSED OPERATING PLAN	FY 2014			FY 2015			FY 2016		FY 2016		FY 2016			FY 2016		FY 2016	
	Spend Plan	POS	FTE	Enacted	POS	FTE	Calculated ATBs	Technical ATBs	POS	FTE	Base	POS	FTE	Program Changes	POS	FTE	President's Budget
National Ocean Service																	
ORF	471,213	1,257	1,195	481,107	0	0	6,564	0	1,257	1,195	487,671	0	0	59,419	1,257	1,195	547,090
PAC	3,694	5	5	3,700	0	0	0	0	5	5	3,700	0	0	0	5	5	3,700
OTHER	23,259	16	16	50,931	0	0	0	(27,761)	16	16	23,170	0	0	0	16	16	23,170
TOTAL, NOS	498,166	1,278	1,216	535,738	0	0	6,564	(27,761)	1,278	1,216	514,541	0	0	59,419	1,278	1,216	573,960
National Marine Fisheries Service																	
ORF	809,297	3,032	2,888	822,138	0	0	14,411	0	3,032	2,888	836,549	71	53	51,687	3,103	2,941	888,236
PAC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER	193,476	40	40	136,056	0	0	0	(37,471)	40	40	98,585	0	0	3,300	40	40	101,885
TOTAL, NMFS	1,002,773	3,072	2,928	958,194	0	0	14,411	(37,471)	3,072	2,928	935,134	71	53	54,987	3,143	2,981	990,121
Oceanic and Atmospheric Research																	
ORF	413,545	751	711	432,900	16	16	4,146	2,484	767	727	439,530	16	13	45,126	783	740	484,656
PAC	10,363	0	0	13,379	0	0	0	0	0	0	13,379	0	0	9,000	0	0	22,379
OTHER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL, OAR	423,908	751	711	446,279	16	16	4,146	2,484	767	727	452,909	16	13	54,126	783	740	507,035
National Weather Service																	
ORF	949,145	4,851	4,616	954,153	0	0	19,343	3,000	4,851	4,616	976,496	(98)	(98)	(12,933)	4,753	4,518	963,563
PAC	113,442	23	22	133,300	0	0	0	(3,000)	23	22	130,300	0	0	5,015	23	22	135,315
OTHER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL, NWS	1,062,587	4,874	4,638	1,087,453	0	0	19,343	0	4,874	4,638	1,106,796	(98)	(98)	(7,918)	4,776	4,540	1,098,878
National Environmental Satellite, Data and Information Service																	
ORF	184,875	584	584	188,600	(7)	(7)	3,445	(7,950)	577	577	184,095	0	0	6,249	577	577	190,344
PAC	1,902,219	302	301	2,034,544	0	1	0	6,150	302	302	2,040,694	8	6	148,589	310	308	2,189,283
OTHER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL, NESDIS	2,087,094	886	885	2,223,144	(7)	(6)	3,445	(1,800)	879	879	2,224,789	8	6	154,838	887	885	2,379,627
Program Support / Corporate Services																	
ORF	202,261	872	828	197,300	(9)	(9)	11,458	21,407	863	819	230,165	15	11	4,341	878	830	234,506
PAC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SUBTOTAL, PS / Corporate Services	202,261	872	828	197,300	(9)	(9)	11,458	21,407	863	819	230,165	15	11	4,341	878	830	234,506
Program Support / NOAA Education Program																	
ORF	27,158	25	23	27,600	0	0	31	0	25	23	27,631	0	0	(11,200)	25	23	16,431
PAC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SUBTOTAL, PS / NOAA Education Program	27,158	25	23	27,600	0	0	31	0	25	23	27,631	0	0	(11,200)	25	23	16,431

LINE OFFICE SUMMARY
(\$ in Thousands)

FY 2016 PROPOSED OPERATING PLAN	FY 2014 Spend Plan	POS	FTE	FY 2015 Enacted	POS	FTE	FY 2016 Calculated ATBs	FY 2016 Technical ATBs	POS	FTE	FY 2016 Base	POS	FTE	FY 2016 Program Changes	POS	FTE	FY 2016 President's Budget
Program Support / Facilities																	
ORF	22,964	47	45	23,000	0	0	67	0	47	45	23,067	0	0	2,000	47	45	25,067
PAC	0	0	0	0	0	0	0	0	0	0	0	0	0	1,000	0	0	1,000
OTHER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SUBTOTAL, PS / Facilities	22,964	47	45	23,000	0	0	67	0	47	45	23,067	0	0	3,000	47	45	26,067
Program Support / Corp Srv, Edu, Fac																	
ORF	252,383	944	896	247,900	(9)	(9)	11,556	21,407	935	887	280,863	15	11	(4,859)	950	898	276,004
PAC	0	0	0	0	0	0	0	0	0	0	0	0	0	1,000	0	0	1,000
OTHER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL, PS / Corp Srv, Edu, Fac	252,383	944	896	247,900	(9)	(9)	11,556	21,407	935	887	280,863	15	11	(3,859)	950	898	277,004
Program Support / Office of Marine and Aviation Operations																	
ORF	200,888	996	949	206,600	0	0	4,531	0	996	949	211,131	0	0	0	996	949	211,131
PAC	5,192	0	0	6,000	0	0	0	0	0	0	6,000	5	4	152,700	5	4	158,700
OTHER	30,205	0	0	30,205	0	0	0	0	0	0	30,205	0	0	0	0	0	30,205
TOTAL, PS / OMAO	236,285	996	949	242,805	0	0	4,531	0	996	949	247,336	5	4	152,700	1,001	953	400,036
Total PS ORF	453,271	1,940	1,845	454,500	(9)	(9)	16,087	21,407	1,931	1,836	491,994	15	11	(4,859)	1,946	1,847	487,135
Total PS PAC	5,192	0	0	6,000	0	0	0	0	0	0	6,000	5	4	153,700	5	4	159,700
Total PS Other	30,205	0	0	30,205	0	0	0	0	0	0	30,205	0	0	0	0	0	30,205
TOTAL, PS	488,668	1,940	1,845	490,705	(9)	(9)	16,087	21,407	1,931	1,836	528,199	20	15	148,841	1,951	1,851	677,040
DIRECT OBLIGATIONS																	
ORF	3,281,346	12,415	11,839	3,333,398	0	0	63,996	18,941	12,415	11,839	3,416,335	4	(21)	144,689	12,419	11,818	3,561,024
PAC	2,034,910	330	328	2,190,923	0	1	0	3,150	330	329	2,194,073	13	10	316,304	343	339	2,510,377
OTHER	246,940	56	56	217,192	0	0	0	(65,232)	56	56	151,960	0	0	3,300	56	56	155,260
TOTAL, DIRECT OBLIGATIONS	5,563,196	12,801	12,223	5,741,513	0	1	63,996	(43,141)	12,801	12,224	5,762,368	17	(11)	464,293	12,818	12,213	6,226,661
ORF Adjustments (Deobligations/Rescissions)	(15,000)	0	0	(15,000)	0	0	0	(2,500)	0	0	(17,500)	0	0	0	0	0	(17,500)
ORF Transfers	(108,954)	0	0	(116,000)	0	0	0	(14,164)	0	0	(130,164)	0	0	0	0	0	(130,164)
PAC Adjustments (Deobligations/Rescissions)	(7,000)	0	0	(13,000)	0	0	0	0	0	0	(13,000)	0	0	0	0	0	(13,000)
PAC Transfers	(5,046)	0	0	1,302	0	0	0	0	0	0	1,302	0	0	0	0	0	1,302
OTHER Discretionary Adjustments	0	0	0	0	0	0	0	(50)	0	0	(50)	0	0	0	0	0	(50)
Mandatory Accounts Excluded	(104,654)	(54)	(54)	(149,906)	0	0	0	65,282	(54)	(54)	(84,624)	0	0	0	(54)	(54)	(84,624)
TOTAL, DISCRETIONARY APPROPRIATIONS	5,322,542	12,747	12,169	5,448,909	0	1	63,996	5,427	12,747	12,170	5,518,332	17	(11)	464,293	12,764	12,159	5,982,625

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Department of Commerce
 National Oceanic and Atmospheric Administration
 Operations, Research, and Facilities
SUMMARY OF RESOURCE REQUIREMENTS
 (Dollar Amounts in Thousands)

	Positions	FTE	Appropriation	Budget Authority	Direct Obligations
FY 2015 Currently Available	12,415	11,839	3,202,398	3,318,398	3,467,016
less: Carryover	0	0	0	0	(133,618)
plus: 2016 Other Adjustments to Base	0	0	66,273	80,437	82,937
FY 2016 Base	12,415	11,839	3,268,671	3,398,835	3,416,335
plus(or less): 2016 Program Changes	4	(21)	144,689	144,689	144,689
FY 2016 Estimate	12,419	11,818	3,413,360	3,543,524	3,561,024

Department of Commerce
 National Oceanic and Atmospheric Administration
 Operations, Research, and Facilities
SUMMARY OF RESOURCE REQUIREMENTS
 (Dollar Amounts in Thousands)

Comparison by program		FY 2014		FY 2015		FY 2016		FY 2016		Increase/ (Decrease)	
		Actuals		Currently Available		Base Program		Estimate		Personnel	Amount
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
National Ocean Service	Pos/BA	1,131	468,583	1,257	481,107	1,257	487,671	1,257	547,090	0	59,419
	FTE/OBL	1,077	489,502	1,195	490,280	1,195	487,671	1,195	547,090	0	59,419
National Marine Fisheries Service	Pos/BA	2,942	804,898	3,032	822,138	3,032	836,549	3,103	888,236	71	51,687
	FTE/OBL	2,802	806,828	2,888	842,785	2,888	836,549	2,941	888,236	53	51,687
Oceanic and Atmospheric Research	Pos/BA	735	411,226	751	432,900	767	439,530	783	484,656	16	45,126
	FTE/OBL	699	448,288	711	444,940	727	439,530	740	484,656	13	45,126
National Weather Service	Pos/BA	4,542	943,847	4,851	954,153	4,851	976,496	4,753	963,563	(98)	(12,933)
	FTE/OBL	4,327	953,054	4,616	1,013,094	4,616	976,496	4,518	963,563	(98)	(12,933)
National Environmental Satellite, Data, & Info Service	Pos/BA	533	183,835	584	188,600	577	184,095	577	190,344	0	6,249
	FTE/OBL	507	188,193	584	190,681	577	184,095	577	190,344	0	6,249
Program Support	Pos/BA	799	256,345	944	247,900	935	280,863	950	276,004	15	(4,859)
	FTE/OBL	761	246,565	896	273,458	887	280,863	898	276,004	11	(4,859)
Office of Marine Aviation & Ops	Pos/BA	979	199,773	996	206,600	996	211,131	996	211,131	0	0
	FTE/OBL	932	199,336	949	211,778	949	211,131	949	211,131	0	0
Less Deobligations/Other	Pos/BA	0	0	0	(15,000)	0	(17,500)	0	(17,500)	0	0
	FTE/OBL	0	0	0	0	0	0	0	0	0	0
Total	Pos/BA	11,661	3,268,507	12,415	3,318,398	12,415	3,398,835	12,419	3,543,524	4	144,689
	FTE/OBL	11,105	3,331,766	11,839	3,467,016	11,839	3,416,335	11,818	3,561,024	(21)	144,689

Department of Commerce
 National Oceanic and Atmospheric Administration
 Operations, Research, and Facilities
SUMMARY OF RESOURCE REQUIREMENTS
 (Dollar Amounts in Thousands)

	FY 2014		FY 2015		FY 2016		FY 2016		Increase/ (Decrease)	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Direct Discretionary Obligation	11,105	3,331,766	11,839	3,467,016	11,839	3,416,335	11,818	3,561,024	(21)	144,689
Total Obligations	11,105	3,331,766	11,839	3,467,016	11,839	3,416,335	11,818	3,561,024	(21)	144,689
Adjustments to Obligations:										
Cash Refunds/Prior Year Recoveries	0	(372)	0	0	0	0	0	0	0	0
Deobligations	0	(17,557)	0	(15,000)	0	(17,500)		(17,500)	0	0
Unobligated Balance Expired	0	3,699	0	0	0	0	0	0	0	0
Unobligated Balance Adj SOY	0	(196,131)	0	0	0	0	0	0	0	0
Unobligated balance, Adj EOY	0	133,618	0	0	0	0	0	0	0	0
Unobligated balance transferred	0	484	0	0						
Unobligated balance, Not Apportioned	0	13,000	0	0	0	0	0	0	0	0
Total Budget Authority	11,105	3,268,507	11,839	3,452,016	11,839	3,398,835	11,818	3,543,524	(21)	144,689
Financing from Transfers and Other:										
Transfer from P&D to ORF	0	(115,000)	0	(116,000)	0	(130,164)	0	(130,164)	0	0
Transfer from FDAF to ORF	0	(75)	0	0	0	0	0	0	0	0
Transfer from Pacific Salmon	0	(65)	0	0	0	0	0	0	0	0
Transfer from PAC to ORF	0	4,025	0	0	0	0	0	0	0	0
Net Appropriation	11,105	3,157,392	11,839	3,336,016	11,839	3,268,671	11,818	3,413,360	(21)	144,689

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Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM and PERFORMANCE: REIMBURSABLE OBLIGATIONS
(Dollar Amounts in Thousands)

	Positions	FTE	Appropriation	Budget Authority	Reimbursable Obligations
FY 2015 Currently Available	706	706	0	406,969	485,772
less: obligations from prior year balances	0	0	0	0	(78,803)
less: 2016 Other Adjustments to Base	0	0	0	(164,969)	(164,969)
FY 2016 Base	706	706	0	242,000	242,000
less: 2016 Program Changes	0	0	0	0	0
FY 2016 Estimate	706	706	0	242,000	242,000

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM and PERFORMANCE: REIMBURSABLE OBLIGATIONS
(Dollar Amounts in Thousands)

Comparison by program		FY 2014		FY 2015		FY 2016		FY 2016		Increase/ (Decrease)	
		Actuals		Currently Available		Base Program		Estimate		Personnel	Amount
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
National Ocean Service	Pos/BA	18	32,086	85	29,571	85	29,000	85	29,000	0	0
	FTE/OBL	18	19,911	85	41,746	85	29,000	85	29,000	0	0
National Marine Fisheries Service	Pos/BA	284	90,119	311	122,947	311	69,000	311	69,000	0	0
	FTE/OBL	284	62,567	311	150,499	311	69,000	311	69,000	0	0
Oceanic and Atmospheric Research	Pos/BA	42	64,303	53	96,815	53	31,000	53	31,000	0	0
	FTE/OBL	42	45,472	53	115,645	53	31,000	53	31,000	0	0
National Weather Service	Pos/BA	177	62,657	174	69,708	174	75,000	174	75,000	0	0
	FTE/OBL	177	48,931	174	83,434	174	75,000	174	75,000	0	0
National Environmental Satellite, Data, and Information Service	Pos/BA	46	26,521	45	63,364	45	23,000	45	23,000	0	0
	FTE/OBL	46	23,355	45	66,530	45	23,000	45	23,000	0	0
Program Support	Pos/BA	37	20,229	38	24,565	38	15,000	38	15,000	0	0
	FTE/OBL	37	16,876	38	27,918	38	15,000	38	15,000	0	0
Total	Pos/BA	604	295,915	706	406,969	706	242,000	706	242,000	0	0
	FTE/OBL	604	217,112	706	485,772	706	242,000	706	242,000	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM and PERFORMANCE: REIMBURSABLE OBLIGATIONS
(Dollar Amounts in Thousands)

	FY 2014 Actuals		FY 2015 Currently Available		FY 2016 Base Program		FY 2016 Estimate		Increase/ (Decrease)	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Reimbursable Obligations	604	217,112	706	485,772	706	242,000	706	242,000	0	0
Total Obligations	604	217,112	706	485,772	706	242,000	706	242,000	0	0
Adjustments to Obligations:										
Deobligations	0	0	0	0	0	0	0	0	0	0
Unobligated balance, SOY Reimbursable	0	0	0	(78,803)	0	0	0	0	0	0
Unobligated balance, EOY Reimbursable	0	78,803	0	0	0	0	0	0	0	0
Unobligated balance, Expiring	0	0	0	0	0	0	0	0	0	0
Total Budget Authority	604	295,915	706	406,969	706	242,000	706	242,000	0	0

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Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
SUMMARY OF FINANCING
(Dollar Amounts in Thousands)

	FY 2014 Actuals	FY 2015 Currently Available	FY 2016 Base Program	FY 2016 Estimate	Increase/ (Decrease)
Direct Discretionary Obligation	3,331,766	3,467,016	3,416,335	3,561,024	144,689
Direct Mandatory Obligation	26,147	28,269	28,269	28,269	0
Reimbursable Obligation	217,112	485,772	242,000	242,000	0
Total Obligations	3,575,025	3,981,057	3,686,604	3,831,293	144,689
Adjustments and Obligations:					
Federal funds	(167,178)	(312,756)	(186,000)	(186,000)	0
Non-Federal Sources	(57,688)	(94,213)	(56,000)	(56,000)	0
Cash Refund	(372)	0	0	0	0
Uncollected Customer Payments from Fed. Sources	(9,991)	0	0	0	0
Deobligations, direct	(17,557)	(15,000)	(17,500)	(17,500)	0
Unobligated balance, Adj SOY	(196,131)	(146,618)	0	0	0
Unobligated balance, transferred to other accounts	484	0	0	0	0
Unobligated balance, EOY	133,618	0	0	0	0
Unobligated balance, Not apportioned	13,000	13,000	0	0	0
Unobligated balance, SOY Reimbursable	(80,362)	(78,803)	0	0	0
Unobligated balance, Expiring Direct	3,699	0	0	0	0
Unobligated balance, Reimbursable Not Apportioned	94,475	0	0	0	0
Unobligated balance, Expired Reimbursable	3,632	0	0	0	0
Total Budget Authority	3,294,654	3,346,667	3,427,104	3,571,793	144,689
Financing from Transfers and Other:					
Transfer from P&D to ORF	(115,000)	(116,000)	(130,164)	(130,164)	0
Transfer from PCSRF to ORF	(65)	0	0	0	0
Transfer from FDAF	(75)	0	0	0	0
NOAA Corps Retirement Pay (Mandatory)	(26,147)	(28,269)	(28,269)	(28,269)	0
Transfer from ORF to PAC	4,025	0	0	0	0
Net Appropriation	3,157,392	3,202,398	3,268,671	3,413,360	144,689

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Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
JUSTIFICATION OF CHANGES TO BASE
(Dollar Amounts in Thousands)

	FTE	Amount
<u>Adjustments:</u>	0	37,091
Restoration of FY 2015 deobligations		15,000,000
Adjustment for DOC Working Capital Fund		22,091,000
 <u>Financing:</u>		
In 2016, NOAA expects to realize recoveries of prior year obligations of \$17,500,000. This amount will be used to offset the budget authority in 2016.	0	(17,500)
		(17,500,000)
 <u>Transfers:</u>	0	(3,150)
NESDIS transfer from ORF National Center for Environmental Information PPA to PAC Satellite Ground Services PPA.	0	(3,785,000)
NESDIS transfer from ORF Product, Development Readiness and Application PPA to PAC System Architecture and Advanced Planning PPA.	0	(124,000)
NESDIS transfer from ORF Satellite and Product Operations PPA to PAC Satellite Ground Services PPA.	0	(2,023,000)
NESDIS transfer from ORF Satellite and Product Operations PPA to PAC System Architecture and Advanced Planning.	0	(218,000)
NWS transfer from PAC Observations PPA to the ORF Observations PPA.	0	3,000,000
	0	(3,150,000)

Department of Commerce
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Operations, Research, and Facilities
JUSTIFICATION OF CHANGES TO BASE
(Dollar Amounts in Thousands)

Pay Raises

Full-year cost of 2015 pay increase and related costs: 0 18,959

The 2016 Budget assumes a pay raise of 1.000% for civilians and a pay raise of 1.000% for military.

Total cost of 2015 pay raise 23,334,332

Less amount funded in 2015 (17,500,749)

Adjustment for FY 2016 of 2015 pay increase 5,833,583

2016 pay increase and related costs:

A general civilian pay raise of 1.300% and NOAA Corp pay raise of 1.300% is assumed to be effective January 1, 2015.

Total cost in 2016 of pay increase 17,500,749

Less amount not funded in 2016 (4,375,187)

Total cost of January 2016 pay increase 13,125,562

Total, adjustment for 2016 pay increase 13,125,562

Full-year cost in 2016 of positions financed for part-year in 2015 0 208

An increase of \$2,247,180 is required to fund the full-year cost in 2016 of positions financed for part-year in 2015. The computation follows:

Annual salary of new positions 9 778,037

8,162

Less 5 percent lapse 0 (39,310)

Full-year cost of personnel compensation 9 746,888

Less personnel compensation included in the 2015 budget (9) (589,362)

Cost of personnel compensation in 2016 (0) 157,526

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JUSTIFICATION OF CHANGES TO BASE
(Dollar Amounts in Thousands)

Adjustment for 2016 pay raise (.013x.75)		1,183	
Add'l amount required for personnel compensation		158,709	
Benefits	0	49,279	
Total adjustments-to-base		207,988	
	0		

Compensable Day

4,346

In FY 2016, there are 262 compensable days, an increase of one day from 261 days in FY 2015.

Civil Service Retirement System (CSRS)

0

(2,238)

The number of employees covered by the Civil Service Retirement System (CSRS) continues to drop as positions become vacant and are filled by employees who are covered by Federal Employees Retirement System (FERS). The estimated percentage covered by CSRS will drop from 7.9% in 2015 to 5.0% in 2016 for regular employees and will remain at 0% in 2016 for law enforcement employees. Contribution rates will remain the same at 7.0% for regular employees and 7.5% for law enforcement.

Regular:

2016 \$1,102,405,000 x 0.05 x .07		3,739,904	
2015 \$1,102,405,000 x 0.79 x .07		6,096,300	
Subtotal		(2,237,882)	

Law Enforcement:

2016 \$5,034,000 x .000 x .075		0	
2015 \$5,034,000 x .000 x .075		0	
Subtotal		0	

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JUSTIFICATION OF CHANGES TO BASE
 (Dollar Amounts in Thousands)

Total adjustment to base (2,237,882)

Federal Employees Retirement System (FERS)

0 9,638

The number of employees covered by the FERS continues to rise as employees covered by CSRS leave and are replaced by employees covered by FERS. The estimated percentage of payroll for regular employees covered by FERS will rise from 92.1% in 2015 to 95.0% in 2016 for regular employees. The estimated percentage of payroll for law enforcement employees covered by FERS will remain at 100% from FY 2015 to FY 2016. The contribution rate for FERS Regular increased from 13.2% to 13.7% while the FERS for Law Enforcement increased from 26.5% to 30.1% in 2016.

Regular	2016 \$1,102,405,000 x 0.95 x 0.1370	143,478,011
	2015 \$1,102,405,000 x 0.921 x 0.1320	134,021,581
	Subtotal	9,456,430

Law Enforcement:

2016 \$5,034,000 x 1.00 x 0.301	1,515,234
2015 \$5,304,000 x 1.00 x 0.265	1,334,010
Subtotal	181,224

Total adjustment to base 9,637,654

Thrift Savings Plan

0 320

The cost of agency contributions to the Thrift Savings Plan will also rise as FERS participation increases. The contribution rate is 1%.

Department of Commerce
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Operations, Research, and Facilities
JUSTIFICATION OF CHANGES TO BASE
(Dollar Amounts in Thousands)

Regular:

2016 \$1,102,405,000 x 0.95 x 0.01	10,472,848
2015 \$1,102,405,000 x 0.921 x 0.01	<u>(10,153,150)</u>
Subtotal	319,697

Law Enforcement:

2016 \$5,034,000 x 1.00 x 0.01	50,340
2015 \$5,034,000 x 1.00 x 0.01	<u>(50,340)</u>
Subtotal	0

Total adjustment to base 319,697

Federal Insurance Contribution Act (FICA)

0 2,083

The maximum salary subject to OASDI tax will increase from \$118,800 in 2015 to \$122,100 in 2016. The OASDI tax rate will remain at 6.2% in 2016.

Regular:

2016 \$1,102,405,000 x .95 x .96 x .062	62,334,388
2015 \$1,102,405,000 x .921 x .959 x .062	<u>60,368,600</u>
Subtotal	1,965,788

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JUSTIFICATION OF CHANGES TO BASE
 (Dollar Amounts in Thousands)

Law Enforcement:

2016 \$5,034,000 x 1.0 x .96 x .062	299,624
2015 \$5,034,000 x 1.0 x .959 x .062	299,312
Subtotal	312

Other	2016 \$65,665,000 x .95 x .96 x .062	3,712,962
	2015 \$65,665,000 x .921 x .959 x .062	3,595,869
	Subtotal	117,093

Total adjustment to base	2,083,193
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Health insurance premiums

Effective January 2016, NOAA's contribution to Federal employees' health insurance premiums will increase. Applied against the 2015 estimate of \$90,095,000, the additional amount required is \$3,009,173.

	0	3,009
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Employees Compensation Fund

Effective January 2016, NOAA's contribution to Federal employees' compensation fund will decrease by \$359,000.

	0	(359)
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Per diem increase

	0	1,898
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Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
JUSTIFICATION OF CHANGES TO BASE
(Dollar Amounts in Thousands)

The General Services Administration increased the standard per diem rate from \$123 to \$129 in 2016. The percent increase of 4.878% was applied to the 2015 estimate of \$38,900,000 to arrive at an increase of \$1,897,542.

Rental payments to GSA

0 1,161

GSA rates are projected to increase 1.5% in 2016. This percentage was applied to the 2015 estimate of \$77,399,000 to arrive at an increase of \$1,160,985.

Postage

0 63

Effective January 26, 2014, the U.S. Postal Service implemented a rate increase for shipping. The percentage increase of 5.3% was applied to the 2015 estimate of \$1,192,000 arrive at an increase of \$63,176.

GPO Printing

0 61

GPO has provided an estimated rate of 1.6%. This percentage was applied to the 2015 estimate of \$3,843,000 to arrive at an increase of \$61,488.

PEPCO Electricity

0 (7)

A decrease of \$7,000 is requested for PEPCO Electricity.

NARA Storage & maintenance costs

0 231

The estimated cost of NARA storage and maintenance for 2016 is projected to increase by \$230,988.

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JUSTIFICATION OF CHANGES TO BASE
(Dollar Amounts in Thousands)

<u>CBS</u>	NOAA requests an increase of \$223,000 for Commerce Business System.	0	223
<u>General Pricing Level Adjustment</u>	This request applies OMB economic assumption of 1.6% for FY 2016 to object classes where the prices the government pays are established through the market system. Factors are applied to transportation of things (\$211,024); rental payment payments to others (\$510,768); communications, utilities and miscellaneous charges (excluding postage) (\$1,231,344); other contractual services (\$11,368,667); supplies and materials (\$1,285,458) and equipment (\$647,792).	0	15,255
<u>Working Capital Fund</u>	The amount of \$7,731,000 to fund inflationary costs within the Departmental Working Capital Fund.	0	7,731
<u>Grants</u>	Grants are projected to increase to 2.8% in 2016. This percentage was applied to the 2015 estimate of \$24,395,000 to arrive at an increase of \$683,060.	0	683
<u>Ship and Aircraft Fuel Costs</u>		0	731
Subtotal, Other Changes		0	63,996
Other Adjustments		0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
JUSTIFICATION OF CHANGES TO BASE
(Dollar Amounts in Thousands)

Less: Absorption

0 0

Total Adjustments to Base

0 80,437

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Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
SUMMARY OF REQUIREMENTS BY OBJECT CLASS
(Dollars Amounts in Thousands)

Object Class	FY 2014 Actuals	FY 2015 Enacted	FY 2016 Base Program	FY 2016 Estimate	Increase / (Decrease)
11 Personnel compensation					
11.1 Full-time permanent	1,052,555	1,087,582	1,105,917	1,104,974	(943)
11.3 Other than full-time permanent	7,357	7,366	7,366	7,366	0
11.5 Other personnel compensation	55,576	55,638	55,638	55,738	100
11.6 Leave Surcharge	(7,245)	(7,253)	(7,253)	(7,253)	0
11.7 Military personnel	32,336	32,372	32,372	32,372	0
11.9 Total Personnel Compensation	1,140,579	1,175,703	1,194,039	1,193,196	(843)
12 Civilian personnel benefits	350,658	372,801	383,054	383,611	557
13 Benefits for former personnel	24,699	24,727	24,727	24,727	0
21 Travel and transportation of persons	39,438	39,482	41,430	43,566	2,136
22 Transportation of things	13,174	13,189	13,400	14,274	874
23.1 Rental payments to GSA	78,824	77,400	78,561	80,300	1,739
23.2 Rental payments to others	30,378	31,924	32,435	32,580	145
23.3 Communications, utilities and miscellaneous charges	78,065	78,152	79,993	84,415	4,422
24 Printing and reproduction	4,393	3,843	3,913	3,964	51
25.1 Advisory and assistance services	167,871	168,059	168,059	197,847	29,788
25.2 Other services from non-Federal sources	511,003	476,313	488,394	501,572	13,178

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
SUMMARY OF REQUIREMENTS BY OBJECT CLASS
(Dollars Amounts in Thousands)

Object Class	FY 2014 Actuals	FY 2015 Enacted	FY 2016 Base Program	FY 2016 Estimate	Increase / (Decrease)
25.3 Other goods and services from Federal sources	101,406	100,936	130,758	132,340	1,582
25.4 Operation and maintenance of facilities	0	0	0	500	500
25.5 Research and development contracts	17,191	17,210	17,210	20,523	3,313
25.7 Operation and maintenance of equipment	0	0	0	6,210	6,210
26 Supplies and materials	113,627	98,754	104,010	108,543	4,533
31 Equipment	44,638	40,488	41,253	45,979	4,726
32 Lands and structures	4,407	4,412	4,412	4,412	0
33 Investments and loans	0	0	0	0	0
41 Grants, subsidies, and contributions	637,464	638,176	638,859	710,637	71,778
42 Insurance claims and indemnities	20	20	20	20	0
43 Interest and dividends	79	79	79	79	0
44 Refunds	0	0	0	0	0
99 Total Obligations	3,357,913	3,361,667	3,444,604	3,589,293	144,689

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
SUMMARY OF REQUIREMENTS BY OBJECT CLASS
(Dollars Amounts in Thousands)

Object Class	FY 2014 Actuals	FY 2015 Enacted	FY 2016 Base Program	FY 2016 Estimate	Increase / (Decrease)
Cash Refunds/Prior Year Recoveries	(372)	0	0	0	0
De-obligations	(17,557)	(15,000)	(17,500)	(17,500)	0
Unobligated Balance, Start of Year	(196,131)	0	0	0	0
Rescission	0	0	0	0	0
Unobligated Balance, End of Year	133,618	0	0	0	0
Unobligated Balance, Expiring	3,699	0	0	0	0
Unobligated Balance, not apportioned	13,000	0	0	0	0
Unobligated Balance, transferred to PAC	484	0	0	0	0
Subtotal Budget Authority	3,294,654	3,346,667	3,427,104	3,571,793	144,689
Less: NOAA Corps	(26,147)	(28,269)	(28,269)	(28,269)	0
Total Discretionary ORF Budget Authority	3,268,507	3,318,398	3,398,835	3,543,524	144,689
Positions	11,661	12,415	12,415	12,419	4
FTE	11,105	11,839	11,839	11,818	(21)

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Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM/SUB-PROGRAM CHANGE CROSSWALK
Part 1 2016 Structure

(Dollar Amounts in thousands)

Program/Sub-program/Program Activity	2016 Direct Obligations	Proposed Changes
National Marine Fisheries Service		
Protected Species Research and Management		
Protected Species Research and Management Programs Base	49,788	Move \$49,788 to Protected Resources Science Management/Marine Mammals, Sea Turtles and Other Species
Species Recovery Grants	22,012	Move \$22,012 to Protected Resources Science Management/Marine Mammals, Sea Turtles and Other Species
Marine Mammals	48,004	Move \$48,004 to Protected Resources Science Management/Marine Mammals, Sea Turtles and Other Species
Marine Turtles	12,447	Move \$12,447 to Protected Resources Science Management/Marine Mammals, Sea Turtles and Other Species
Other Protected Species (Marine Fish, Plants, and Invertebrates)	11,400	Move \$11,400 to Protected Resources Science Management/Marine Mammals, Sea Turtles and Other Species
Atlantic Salmon	6,163	Move \$6,163 to Protected Resources Science Management/ESA Salmon
Pacific Salmon (for Salmon Management Activities, See FRM)	62,338	Move \$62,338 to Protected Resources Science Management/ESA Salmon
Fisheries Research and Management		
Fisheries Research and Management Programs	196,808	Move \$154 to Protected Resources Science and Management/Marine Mammals, Sea Turtles and Other Species and \$109,365 to Fisheries Science and Management/Fisheries and Ecosystem Science Programs and Services and \$77,606 to Fisheries Science and Management/Fisheries Management Programs and Services and \$9,683 to Habitat Conservation and Restoration/Habitat Management and Restoration
National Catch Share Program	27,505	Move \$27,505 to Fisheries Science and Management/Fisheries Management Programs and Services
Expand Annual Stock Assessments – Improve Data Collection	73,749	Move \$73,749 to Fisheries Science and Management/Fisheries Data Collections, Surveys, and Assessments
Economics & Social Sciences Research	7,446	Move \$7,446 to Fisheries Science and Management/Fisheries and Ecosystem Science Programs and Services
Salmon Management Activities	27,462	Move \$27,462 to Fisheries Science and Management/Salmon Management Activities
Regional Councils and Fisheries Commissions	33,470	Move \$33,470 to Fisheries Science and Management/Regional

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM/SUB-PROGRAM CHANGE CROSSWALK
Part 1 2016 Structure

(Dollar Amounts in thousands)

		Councils and Fisheries Commissions
Fisheries Statistics	22,432	Move \$22,432 to Fisheries Science and Management/Fisheries Data Collections, Surveys, and Assessments
Fish Information Networks	22,080	Move \$22,080 to Fisheries Science and Management/Fisheries Data Collections, Surveys, and Assessments
Survey and Monitoring Projects	24,503	Move \$24,102 to Fisheries Science and Management/Fisheries Data Collections, Surveys, and Assessments and \$401 to Habitat Conservation and Restoration/Habitat Management and Restoration
Fisheries Oceanography	2,133	Move \$2,133 to Fisheries Science and Management/Fisheries and Ecosystem Science Programs and Services
American Fisheries Act	3,812	Move \$2,830 to Fisheries Science and Management/ Fisheries Data Collections, Surveys, and Assessments and \$982 to Fisheries Science and Management/Fisheries Management Programs and Services
Interjurisdictional Fisheries Grants	2,505	Move \$2,505 to Fisheries Science and Management/Regional Councils and Fisheries Commissions
National Standard 8	1,024	Move \$1,024 to Fisheries Science and Management/Fisheries and Ecosystem Science Programs and Services
Reducing Bycatch	3,519	Move \$663 to Fisheries Science and Management/Observers and Training and \$2,856 to Fisheries Science and Management/Fisheries Management Programs and Services
Product Quality and Safety	6,870	Move \$6,870 to Fisheries Science and Management/Fisheries Management Programs and Services
Enforcement & Observers/Training		
Enforcement	70,018	Move \$70,018 to Enforcement/Enforcement
Observers/Training	44,087	Move \$44,087 to Fisheries Science and Management/Observers and Training
Habitat Conservation & Restoration		
Habitat Management & Restoration	42,650	Move \$42,650 to Habitat Conservation and Restoration/Habitat Management and Restoration
Other Activities Supporting Fisheries		
Antarctic Research	2,967	Move \$2,967 to Fisheries Science and Management/Fisheries and Ecosystem Science Programs and Services
Aquaculture	7,825	Move \$7,825 to Fisheries Science and Management/Fisheries Management Programs and Services

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM/SUB-PROGRAM CHANGE CROSSWALK
Part 1 2016 Structure

(Dollar Amounts in thousands)

Climate Regimes & Ecosystem Productivity	2,914	Move \$2,914 to Fisheries Science and Management/Fisheries and Ecosystem Science Programs and Services
Computer Hardware and Software	1,807	Move \$1,807 to Fisheries Science and Management/Fisheries and Ecosystem Science Programs and Services
Cooperative Research	12,108	Move \$12,108 to Fisheries Science and Management/Fisheries Data Collections, Surveys, and Assessments
Information Analyses & Dissemination	15,359	Move \$15,359 to Fisheries Science and Management/Fisheries and Ecosystem Science Programs and Services
Marine Resources Monitoring, Assessment & Prediction Prgm (MARMAP)	801	Move \$801 to Fisheries Science and Management/Fisheries Data Collections, Surveys, and Assessments
National Environmental Policy Act (NEPA)	6,628	Move \$1,905 to Protected Resources Science and Management/Marine Mammals, Sea Turtles and Other Species and \$4,723 to Fisheries Science and Management/Fisheries Management Programs and Services
NMFS Facilities Maintenance	3,302	Move \$3,302 to Fisheries Science and Management/Fisheries and Ecosystem Science Programs and Services
Regional Studies	10,300	Move \$5,149 to Fisheries Science and Management/Fisheries Data Collections, Surveys, and Assessments and \$5,151 to Habitat Conservation and Restoration/Habitat Management and Restoration

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Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM/SUB-PROGRAM CHANGE CROSSWALK
Part 2 2016 Structure
(Dollar Amounts in thousands)

Program/Sub-program/Program Activity	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016
National Marine Fisheries Service					
Protected Species Research and Management					
Protected Species Research and Management Programs Base	39,350	37,615	38,939	39,000	0
Species Recovery Grants	2,788	4,022	4,992	5,000	0
Marine Mammals	49,153	46,257	48,924	49,000	
Marine Turtles	12,387	12,006	12,181	12,200	0
Other Protected Species (Marine Fish, Plants, and Invertebrates)	6,538	6,557	6,989	8,000	0
Atlantic Salmon	5,563	4,658	4,992	5,500	
Pacific Salmon (for Salmon Management Activities, See FRM)	58,380	54,406	59,408	60,000	0
Subtotal, Protected Species Research and Management	174,159	165,521	176,425	178,700	0
Fisheries Research and Management					
Fisheries Research and Management Programs	178,432	170,470	174,728	175,500	0
National Catch Share Program	27,911	24,457	24,961	25,000	0
Expand Annual Stock Assessments – Improve Data Collection	63,562	63,950	68,893	70,000	0
Economics & Social Sciences Research	7,633	6,801	7,289	7,300	0
Salmon Management Activities	33,341	36,332	30,153	30,200	0
Regional Councils and Fisheries Commissions	31,754	29,397	31,950	32,738	0
Fisheries Statistics	23,150	21,614	21,966	22,000	0
Fish Information Networks	21,996	20,588	21,966	22,000	0

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM/SUB-PROGRAM CHANGE CROSSWALK
Part 2 2016 Structure
(Dollar Amounts in thousands)

Survey and Monitoring Projects	21,710	22,671	23,963	24,000	0
Fisheries Oceanography	2,140	2,049	2,157	2,100	0
American Fisheries Act	3,876	3,541	3,694	3,700	0
Interjurisdictional Fisheries Grants	0	1,863	2,496	2,500	0
National Standard 8	997	948	998	1,000	0
Reducing Bycatch	3,381	3,205	3,495	3,500	0
Product Quality and Safety	6,192	6,138	6,690	6,700	0
Subtotal, Fisheries Research and Management	426,075	414,024	425,399	428,238	0
Enforcement & Observers/Training					
Enforcement	65,617	62,533	62,899	65,000	0
Observers/Training	39,744	40,214	42,933	43,000	0
Subtotal, Enforcement & Observers/Training	105,361	102,747	105,832	108,000	0
Habitat Conservation & Restoration					
Sustainable Habitat Management	20,892	19,563	20,967	47,000	0
Fisheries Habitat Restoration	20,765	19,285	20,668	0	0
Subtotal, Habitat Conservation & Restoration		38,848	41,635	47,000	0
Other Activities Supporting Fisheries					
Antarctic Research	1,640	2,609	2,895	2,900	0
Aquaculture	5,575	5,293	5,591	5,700	0
Climate Regimes & Ecosystem Productivity	1,741	1,683	1,997	2,000	0
Computer Hardware and Software	1,790	1,717	1,797	1,800	0
Cooperative Research	10,965	11,179	11,981	12,000	0
Information Analyses & Dissemination	15,328	14,254	14,977	15,000	0

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
PROGRAM/SUB-PROGRAM CHANGE CROSSWALK
Part 2 2016 Structure
(Dollar Amounts in thousands)

Marine Resources Monitoring, Assessment & Prediction Prgm (MARMAP)	502	745	799	800	0
National Environmental Policy Act (NEPA)	6,446	6,056	6,490	6,500	0
NMFS Facilities Maintenance	3,283	3,075	3,295	3,300	0
Regional Studies	10,196	9,502	10,184	10,200	0
Subtotal, Other Activities Supporting Fisheries	57,466	56,113	60,006	60,200	0
Protected Resources Science and Management					
Marine Mammals, Sea Turtles & Other Species	0	0	0	0	145,710
ESA Salmon	0	0	0	0	68,501
Subtotal, Protected Resources Science and Management	0	0	0	0	214,211
Fisheries Science and Management					
Fisheries and Ecosystem Science Programs and Services	0	0	0	0	146,317
Fisheries Data Collections, Surveys, and Assessments	0	0	0	0	163,251
Observers and Training	0	0	0	0	44,750
Fisheries Management Programs and Services	0	0	0	0	128,367
Salmon Management Activities	0	0	0	0	27,462
Regional Councils and Fisheries Commissions	0	0	0	0	35,975
Subtotal, Fisheries Science and Management	0	0	0	0	546,122
Enforcement					
Enforcement	0	0	0	0	70,018
Subtotal, Enforcement	0	0	0	0	70,018

Department of Commerce
 National Oceanic and Atmospheric Administration
 Operations, Research, and Facilities
PROGRAM/SUB-PROGRAM CHANGE CROSSWALK
Part 2 2016 Structure
 (Dollar Amounts in thousands)

Habitat Conservation and Restoration					
Habitat Management and Restoration	0	0	0	0	57,885
Subtotal, Habitat Conservation and Restoration	0	0	0	0	57,885
Undistributed ATBs	0	0	0	0	0
Total, National Marine Fisheries Service	804,718	777,253	809,297	822,138	888,236

Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
CONSULTING AND RELATED SERVICES
(Dollar Amounts in Thousands)

	<u>2014 Actual</u>	<u>Estimate</u>	<u>Estimate</u>
Management and Professional Support Services	\$65,469	2015\$65,543	2016\$77,160
Studies, Analysis and Evaluations	\$26,860	\$26,890	\$31,656
Engineering and Technical Services	\$75,542	\$75,626	\$89,031
Total	<u>\$167,871</u>	<u>\$168,059</u>	<u>\$197,847</u>

Consulting Services are those services of a pure nature relating to the governmental functions of agency administration and management and agency problem management. These services are normally provided by persons or organizations generally considered to have knowledge and special abilities that are not usually available within the agency. Such services can be obtained through personnel appointments, procurement contracts, or advisory committees.

Management and professional services deal with management data collection, policy review or development, program development, review or evaluation, systems engineering and other management support services. Special studies and analyses deal with the highly specialized areas of agency activity, e.g., air quality, chemical, environmental, geophysical, oceanographic, technological, and etc. Management and support services for research and development are procurement actions that meet the description of management and professional services or special studies and analyses but are funded under research and development.

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Department of Commerce
 National Oceanic and Atmospheric Administration
 Operations, Research, and Facilities
PERIODICAL, PAMPHLETS, AND AUDIOVISUAL PRODUCTS
 (Dollar Amounts in Thousands)

	<u>2014</u> <u>Actual</u>	<u>2015</u> <u>Estimate</u>	<u>2016</u> <u>Estimate</u>
Periodicals	\$2,130	\$1,863	\$1,922
Pamphlets	\$1,535	\$1,343	\$1,385
Audiovisuals	\$728	\$637	\$657
Total	\$4,393	\$3,843	\$3,964

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Department of Commerce
National Oceanic and Atmospheric Administration
Operations, Research, and Facilities
AVERAGE GRADE AND SALARY

	2014 <u>Actual</u>	2015 <u>Estimate</u>	2016 <u>Estimate</u>
Average executive and SES level pay plans	\$169,827	\$171,525	\$173,755
Average GS/GM grade	12	12	12
Average GS/GM salary	\$94,049	\$94,990	\$96,225
Average Pay Band salary	\$102,773	\$103,800	\$105,150
Average Commissioned Officers salary	\$113,982	\$115,122	\$116,618
Average salary for other positions (FWS/Wage Marine)	\$58,302	\$58,885	\$59,651

Average salaries provided here reflect Federal Civilian and Military pay raises for 2015 and 2016, respectively.

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Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition, and Construction
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar Amounts in Thousands)

	Positions	FTE	Appropriation	Budget Authority	Direct Obligations
FY 2015 Currently Available	330	328	2,179,225	2,177,923	2,315,517
Less: Carryover	0	0	0	0	(124,594)
Plus: 2016 Other Adjustments to Base	0	1	3,150	3,150	3,150
FY 2016 Base	330	329	2,182,375	2,181,073	2,194,073
Plus (or less): 2016 Program Changes	13	10	316,304	316,304	316,304
FY 2016 Estimate	343	339	2,498,679	2,497,377	2,510,377

Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition, and Construction
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar Amounts in Thousands)

Comparison by program/sub-program		FY 2014		FY 2015		FY 2016		FY 2016		Increase/ (Decrease)	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
National Ocean Service	Pos/BA	2	3,676	5	3,700	5	3,700	5	3,700	0	0
	FTE/OBL	2	4,163	5	5,374	5	3,700	5	3,700	0	0
National Marine Fisheries Service	Pos/BA	0	0	0	0	0	0	0	0	0	0
	FTE/OBL	0	2	0	1,954	0	0	0	0	0	0
Oceanic and Atmospheric Research	Pos/BA	0	10,317	0	13,379	0	13,379	0	22,379	0	9,000
	FTE/OBL	0	30,598	0	17,446	0	13,379	0	22,379	0	9,000
National Weather Service	Pos/BA	31	112,938	23	133,300	23	130,300	23	135,315	0	5,015
	FTE/OBL	29	105,856	22	199,655	22	130,300	22	135,315	0	5,015
National Environmental Satellite, Data, & Information Service	Pos/BA	176	1,893,792	302	2,034,544	302	2,040,694	310	2,189,283	8	148,589
	FTE/OBL	167	1,889,502	301	2,046,736	302	2,040,694	308	2,189,283	6	148,589
Program Support	Pos/BA	0	0	0	0	0	0	0	1,000	0	1,000
	FTE/OBL	0	791	0	223	0	0	0	1,000	0	1,000
Office of Marine Aviation & Operations	Pos/BA	0	5,166	0	6,000	0	6,000	5	158,700	5	152,700
	FTE/OBL	0	19,180	0	44,129	0	6,000	4	158,700	4	152,700
Less Deobligations/Other	Pos/BA	0	0	0	(13,000)	0	(13,000)	0	(13,000)	0	0
	FTE/OBL	0	0	0	0	0	0	0	0	0	0
Total	Pos/BA	209	2,025,889	330	2,177,923	330	2,181,073	343	2,497,377	13	316,304
	FTE/OBL	198	2,050,092	328	2,315,517	329	2,194,073	339	2,510,377	10	316,304

Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition, and Construction
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar Amounts in Thousands)

	FY 2014		FY 2015		FY 2016		FY 2016		Increase/ (Decrease)	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Direct Discretionary Obligation	198	2,050,092	328	2,315,517	329	2,194,073	339	2,510,377	10	316,304
Total Obligations	198	2,050,092	328	2,315,517	329	2,194,073	339	2,510,377	10	316,304
Adjustments to Obligations:										
Cash Refunds	0	(1,111)	0	0	0	0	0	0	0	0
Deobligations	0	(5,498)	0	(13,000)	0	(13,000)	0	(13,000)	0	0
Unobligated Balance Expiring	0	1,244	0	0	0	0	0	0	0	0
Unobligated Balance Adj SOY	0	(142,948)	0	(124,594)	0	0	0	0	0	0
Unobligated balance, Adj EOY	0	124,594	0	0	0	0	0	0	0	0
Unobligated balance transferred from ORF	0	(484)	0	0	0	0	0	0	0	0
Total Budget Authority	198	2,025,889	328	2,177,923	329	2,181,073	339	2,497,377	10	316,304
Financing from Transfers and Other:										
Transfer from ORF to PAC	0	(4,025)	0	0	0	0	0	0	0	0
Transfer to OIG	0	1,000	0	1,302	0	1,302	0	1,302	0	0
Net Appropriation	198	2,022,864	328	2,179,225	329	2,182,375	339	2,498,679	10	316,304

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Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition, and Construction
SUMMARY OF FINANCING
(Dollar Amounts in Thousands)

	FY 2014 Actuals	FY 2015 Currently Available	FY 2016 Base Program	FY 2016 Estimate	Increase/ (Decrease)
Direct Discretionary Obligation	2,050,092	2,315,517	2,194,073	2,510,377	316,304
Total Obligations	2,050,092	2,315,517	2,194,073	2,510,377	316,304
Adjustments and Obligations:					
Cash Refund	0	0	0	0	0
Recoveries	(1,111)	0	0	0	0
Deobligations	(5,498)	(13,000)	(13,000)	(13,000)	0
Unobligated balance, adj. SOY	(142,948)	(124,594)	0	0	0
Unobligated balance, EOY	124,594	0	0	0	0
Unobligated balance, expiring EOY	1,244	0	0	0	0
Unobligated Balance, transferred from ORF	(484)	0	0	0	0
Total Budget Authority	2,025,889	2,177,923	2,181,073	2,497,377	316,304
Financing from Transfers and Other:					
Transfer from ORF to PAC	(4,025)	0	0	0	0
Transfer to OIG	1,000	1,302	1,302	1,302	0
Net Appropriation	2,022,864	2,179,225	2,182,375	2,498,679	316,304

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Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition, and Construction
JUSTIFICATION OF CHANGES TO BASE
(Dollar Amounts in Thousands)

		FTE	Amount
<u>Adjustments:</u>			
Restoration of FY 2015 deobligations	13,000,000	0	13,000
<u>Financing:</u>			
In 2016, NOAA expects to realize recoveries of prior year obligations of \$13,000,000. This amount will be used to offset the budget authority in 2016.	(13,000,000)	0	(13,000)
<u>Transfers:</u>			
NESDIS transfer from ORF National Environmental Information Office PPA to Satellite Ground Services PPA.	0	0	3,150
NESDIS transfer from ORF Product, Development Readiness and Application PPA to System Architecture and Advanced Planning PPA.	0		
	0		124,000
NESDIS transfer from ORF Satellite and Product Operations PPA to Satellite Ground Services PPA.	0		2,023,000
NESDIS transfer from ORF Satellite and Product Operations PPA to System Architecture and Advanced Planning.	0		218,000
NWS transfer from PAC Observations PPA to the ORF Observations PPA.	0		(3,000,000)
	0		3,150,000
Total Adjustments to Base		0	3,150

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Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition, and Construction
SUMMARY OF REQUIREMENTS BY OBJECT CLASS
(Dollars amounts in Thousands)

Object Class	FY 2014 Actuals	FY 2015 Enacted	FY 2016 Base Program	FY 2016 Estimate	Increase / (Decrease)
11 Personnel compensation					
11.1 Full-time permanent	32,942	35,205	39,633	40,851	1,218
11.3 Other than full-time permanent	157	168	168	168	0
11.5 Other personnel compensation	1,074	1,147	1,147	1,147	0
11.6 Leave Surcharge	15	16	16	16	0
11.7 Military personnel	0	0	0	0	0
11.9 Total Personnel Compensation	34,188	36,537	40,965	42,183	1,218
12 Civilian personnel benefits	9,448	10,097	11,819	12,264	445
13 Benefits for former personnel	10	10	10	10	0
21 Travel and transportation of persons	1,800	1,923	1,923	1,998	75
22 Transportation of things	61	65	65	65	0
23.1 Rental payments to GSA	5,456	5,831	5,831	4,745	(1,086)
23.2 Rental payments to others	0	0	0	0	0
23.3 Communications, utilities and miscellaneous charges	4,922	5,260	5,260	5,260	0
24 Printing and reproduction	3	4	4	4	0
25.1 Advisory and assistance services	53,187	56,840	56,840	56,825	(15)
25.2 Other services	135,494	144,801	144,801	333,716	188,915

Department of Commerce
National Oceanic and Atmospheric Administration
Procurement, Acquisition, and Construction
SUMMARY OF REQUIREMENTS BY OBJECT CLASS
(Dollars amounts in Thousands)

Object Class	FY 2014 Actuals	FY 2015 Enacted	FY 2016 Base Program	FY 2016 Estimate	Increase / (Decrease)
25.3 Purchases of goods and services from Govt accounts	1,478,959	1,580,556	1,580,556	1,695,935	115,379
25.4 Operation and maintenance of facilities	0	0	0	0	0
25.5 Research and development contracts	21,686	23,176	23,176	25,893	2,717
26 Supplies and materials	16,978	18,144	15,144	21,822	6,678
31 Equipment	252,743	270,105	270,105	278,006	7,901
32 Lands and structures	171	183	183	(3,968)	(4,151)
33 Investments and loans	0	0	0	0	0
41 Grants, subsidies and contributions	34,973	37,376	37,376	35,604	(1,772)
42 Insurance claims and indemnities	0	0	0	0	0
43 Interest and dividends	13	13	13	13	0
44 Refunds	0	0	0	0	0
99 Total Obligations	2,050,092	2,190,923	2,194,073	2,510,377	316,304

Department of Commerce
 National Oceanic and Atmospheric Administration
 Procurement, Acquisition, and Construction
SUMMARY OF REQUIREMENTS BY OBJECT CLASS
 (Dollars amounts in Thousands)

	FY 2014 Actuals	FY 2015 Enacted	FY 2016 Base Program	FY 2016 Estimate	Increase / (Decrease)
Cash Refund/Prior Year Recoveries	(1,111)	0	0	0	0
Deobligations	(5,498)	(13,000)	(13,000)	(13,000)	0
Unobligated Balance, expiring	1,244	0	0	0	0
Unobligated Balance, Start of Year	(142,948)	0	0	0	0
Unobligated Balance, End of Year	124,594	0	0	0	0
Unobligated Balance, not apportioned	(484)	0	0	0	0
Subtotal Budget Authority	2,025,889	2,177,923	2,181,073	2,497,377	316,304
Total Discretionary PAC Budget Authority	2,025,889	2,177,923	2,181,073	2,497,377	316,304
Positions	209	330	330	343	13
FTE	198	328	329	339	10

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BUDGET PROGRAM: NATIONAL OCEAN SERVICE

For FY 2016, NOAA requests a total of \$573,960,000 and 1,216 FTE for the National Ocean Service, including an increase of \$59,419,000 and 0 FTE in net program changes.

National Ocean Service Overview

The National Ocean Service (NOS) is responsible for enabling and promoting the sustainable, safe, and efficient use of coastal resources and places. As marine resources face increasing threats, NOS's science-based products and services have never been more essential to the Nation's economic and ecological well-being. In addition to informing smart resource management and stewardship, NOS directly enables the safe and efficient operation of all oceangoing economic activity, including maritime commerce, offshore energy development, fishing, aquaculture, and tourism.

The National Ocean Service is organized into three sub-programs within the Operations, Research, and Facilities (ORF) account (\$487,671,000 and 1,195 FTE).

- Navigation, Observations and Positioning (\$195,500,000 and 552 FTE) includes NOAA's physical oceanographic activities conducted under the Coast and Geodetic Survey Act, the Hydrographic Services Improvement Act, the Integrated Coastal and Ocean Observation System Act, and the Ocean and Coastal Mapping Integration Act.
- Coastal Science and Assessment (\$81,600,000 and 297 FTE) includes research, response, assessment and monitoring programs conducted under the Harmful Algal Bloom and Hypoxia Research and Control Act; the National Coastal Monitoring Act; the Marine Debris Act; the Oceans and Human Health Act; the Oil Pollution Act; and the Comprehensive Environmental Response, Compensation, and Liability Act.
- Ocean and Coastal Management and Services (\$210,517,000 and 346 FTE) includes NOAA programs conducted under the Coastal Zone Management Act, the National Marine Sanctuaries Act, Executive Order 13158 (Marine Protected Areas) and the Coral Reef Conservation Act.

NOS Procurement, Acquisition, and Construction (PAC) activities (\$3,700,000 and 5 FTE) include the National Estuarine Research Reserve System (NERRS) Construction and Land Acquisition Program and the National Marine Sanctuaries Construction Program.

NOS manages three mandatory accounts:

- The NOAA Damage Assessment and Restoration Revolving Fund (\$20,968,000 and 16 FTE) facilitates and sustains (1) natural resource damage assessment while the Departments of Commerce and Justice seek full reimbursement from potentially responsible parties; and (2) restoration, replacement or acquisition of the equivalent of injured or lost natural resources, including resources of National Marine Sanctuaries and National Estuarine Research Reserves, tidal wetlands, and other habitats for which NOAA is trustee. The Office of General Counsel, the National Ocean Service, and the National Marine Fisheries Service jointly conduct these program functions within NOAA.
- The Sanctuaries Enforcement Asset Forfeiture Fund (\$124,000 and 0 FTE) receives proceeds from civil penalties and forfeiture claims against responsible parties, as determined through court settlements or decisions, for violations of NOAA sanctuary regulations. Proceeds from penalties and forfeitures are held in sanctuary site-specific accounts and spent on resource protection within the sanctuary site where the violation

occurred. Funds are available for resource protection purposes which may include all aspects of law enforcement (from equipment to labor), community oriented policing programs, and other resource protection and management measures such as the installation of mooring buoys or restoration of injured resources.

- The Gulf Coast Ecosystem Restoration Science, Observation, Monitoring and Technology Fund (\$2,078,000 and 0 FTE) provides funding for the NOAA RESTORE Act Science Program. The purpose of this program is to initiate and sustain an integrative, holistic understanding of the Gulf of Mexico ecosystem and support, to the maximum extent practicable, restoration efforts and the long-term sustainability of the ecosystem, including its fish stocks, fishing industries, habitat, and wildlife through ecosystem research, observation, monitoring, and technology development.

The decennial Census counted 163.8 million people (over 50 percent of the United States population) living in coastal counties in 2010, and this number is expected to increase by more than 15 million by 2020 (*National Coastal Population Report*, <http://stateofthecoast.noaa.gov>). As population densities and economic activity increase, so do their negative externalities: port congestion, navigation hazards, shoreline erosion, pollution, and other ill effects. These pressures, along with long-term environmental shifts such as sea level change, ocean acidification and the increasing incidence of catastrophic weather events, make the task of managing coastal resources increasingly difficult. States, other Federal agencies, coastal communities, and coastal industries depend on NOS for data, expertise, and services to sustain lives and livelihoods, reduce risk, and adapt to change.

For example, NOS's physical oceanographic science activities—mapping, observations, and positioning—are essential to not only the safety and efficiency of maritime commerce, but also to the management of coastal resources, planning for multiple uses of coastal areas, and mitigating coastal threats. In addition, NOS provides scientific expertise on releases of oil, chemicals and marine debris, to enable sound decision-making in the response, assessment and restoration of damaged coastal resources. In collaboration with international, Federal, state, and local managers, NOS is the steward of the National Marine Sanctuaries System and the Papahānaumokuākea Marine National Monument, the main Federal partner to state-managed National Estuarine Research Reserves, and the coordinator of the National System of Marine Protected Areas. NOS also helps its Federal and non-Federal partners use state-managed and privately-owned coastal ecosystem services sustainably through financial and technical assistance, applied research, effective policies, and partnership-building.

NOS staff and facilities are located around the country, with concentrations in Silver Spring, MD; Charleston, SC; Seattle, WA; Norfolk, VA; Mobile, AL; Beaufort, NC; and Honolulu, HI.

Research and Development (R&D) Investments:

The NOAA FY 2016 Budget estimates for R&D investments are the result of an integrated requirements-based strategic planning process. This process provides the structure to link NOAA's strategic vision with programmatic detail and budget development, with the goal of maximizing resources while optimizing capabilities. NOS requests \$76,943,000 for investments in R&D in the FY 2016 Budget.

The NOAA Research Council – an internal body composed of senior scientific personnel from every Line Office in the agency – developed NOAA's most recent '5-Year Research and Development Plan' (FY 2013-2017). This plan guides NOAA's R&D activities and provides a common understanding among NOAA's leadership, its workforce, its partners, constituents and Congress on the value of NOAA's R&D activities.

Significant Inflationary Adjustments:

NOAA's FY 2016 Base includes an increase of \$6,564,000 and 0 FTE to account for the full funding requirement for inflationary adjustments to current programs for NOS activities. This includes the estimated 2016 Federal pay raise of 1.3 percent as well as inflationary increases for non-labor activities, including service contracts, utilities, field office lease payments, and rent charges from the General Services Administration (GSA).

Headquarters Administrative Costs:

In FY 2016, NOS headquarters will use \$25,342,347 for Line Office management activities, policy direction, financial management, information technology, facilities, and other general operating costs, including service contracts, utilities, and rent payments to the General Services Administration. These headquarters administrative funds will support the following:

Headquarters Program Support Type	Description	FY 2016 Amount	FY 2016 FTE associated with NOS HQ
General Management & Direction/Executive Management	Includes Assistant Administrator's office, public affairs, information services	\$11,171,738	38
Budget & Finance	Includes Budget, Finance and Accounting	\$3,871,935	16
Facilities/Other Administrative Functions (CAO Functions)	Includes Facilities and Security costs, as well as other CAO related activities	\$2,371,672	2
Human Resources	All HR services, including EEO	\$926,387	5
Acquisitions and Grants		\$252,819	2
Information Technology	Includes IT-related expenses and other CIO related activities	\$6,747,796	13
Total		\$25,342,347	76

APPROPRIATION ACCOUNT: OPERATIONS, RESEARCH, AND FACILITIES
SUB-PROGRAM: NAVIGATION, OBSERVATIONS AND POSITIONING

NOAA carries out the Navigation, Observations and Positioning sub-program under the Coast and Geodetic Survey Act, the Hydrographic Services Improvement Act (as amended in 2008), the Integrated Coastal and Ocean Observation System Act, and the Ocean and Coastal Mapping Integration Act. NOAA also represents these programs for the Department of Commerce on the interagency Committee on the Marine Transportation System.

NOS's activities under this sub-program produce an integrated suite of physical oceanographic data and applications that is essential to safe, efficient, and sustainable uses of busy coastal areas and waterways. Positioning and geodetic control provide the foundational data layer for mapping of underwater features and observations of coastal environmental variables. In addition to enabling safe navigation, these activities provide actionable environmental intelligence to inform decision-makers in the coastal landscape. Storm surge forecasting, ecological forecasting, coastal industries, habitat restoration, coastal ocean science and oil spill response, to name just a few of these uses, all rely on these NOS products and services.

The following program offices are responsible for carrying out the Navigation, Observations, and Positioning sub-program:

- **Office of Coast Survey (OCS)** Established by President Thomas Jefferson in 1807, OCS is the longest-standing NOAA program and U.S. Government scientific agency. OCS is responsible for surveying and charting the Nation's waters. The OCS director serves as the Nation's Hydrographer and represents the United States in the International Hydrographic Organization, which sets standards for surveying and charting and builds hydrographic capacity in other nations for safe navigation globally.
- **National Geodetic Survey (NGS)** NGS's geodesy program defines, maintains and provides access to the National Spatial Reference System. NGS's coastal mapping program provides data for navigation charts, defines the national shoreline and aids emergency response, among other functions. In addition, NGS develops industry guidelines, specifications, and standards and provides training for conducting geodetic surveys and using surveying equipment.
- **Center for Operational Oceanographic Products and Services (CO-OPS)** CO-OPS provides the national infrastructure, expertise and services to collect and disseminate oceanographic and meteorological observations. These observations include tide, current, water level, and other coastal variables that support NOAA's missions and other coastal and marine activity, both public and private.
- **Integrated Ocean Observing System (IOOS)** NOAA leads the implementation and administration of IOOS. IOOS integrates the vast network of Federal and non-Federal observing systems to fulfill regional, national and global needs. At the national level, U.S. IOOS represents a partnership of 17 Federal agencies and 11 Regional Associations (RAs) that conduct coastal and ocean observing. These organizations share responsibility for the design, operation and improvement of global, national and regional networks.

The narrative below describes programs funded through the Navigation, Observations and Positioning; Hydrographic Survey Priorities/Contracts; and IOOS Regional Observations program activities.

Navigation, Observations and Positioning

Navigation Charts and Services

The Coast and Geodetic Survey Act and the Hydrographic Services Improvement Act (as amended) authorize NOAA to survey and chart the 3.4 million square nautical miles of waters in the U.S. Exclusive Economic Zone (EEZ). NOAA meets the navigation information needs of vessel operators that are carrying ever-larger payloads of passengers, cargo and hazardous materials. Users of NOAA navigation products and services include commercial shippers, fishers, the U.S. Navy, the U.S. Coast Guard, state and local governments, and recreational boaters. NOAA also conducts research and development to improve the accuracy and productivity of hydrography and charting efforts.

In addition to navigation uses, mapping data provide a foundation for other applications including coastal zone management, emergency management, climate assessments and coastal research. NOAA also leads the interagency Integrated Ocean and Coastal Mapping (IOCM) initiative as authorized by the Ocean and Coastal Mapping Integration Act. NOAA's IOCM activities include coordination and interagency collaboration on data acquisition, management, processing and tools development, for maximum use and re-use of ocean and coastal mapping data from all sources: Federal, state, regional, local, academic, and the private sector.

The following activities compose NOAA's integrated suite of charting and navigation products and services:

- **Hydrographic Surveys** – NOAA acquires hydrographic data through the NOAA hydrographic fleet and contract surveyors. These surveys, primarily in the 511,000 square nautical miles of navigationally significant U.S. waters, provide essential depth and hazardous obstruction data for nautical charts and other applications such as water level modeling, fisheries management, and coastal planning. NOAA personnel participate in surveys using NOAA platforms to maintain the necessary technical expertise to oversee contracts, quality control data, develop survey technologies, and coordinate with the International Hydrographic Organization and other nations.
- **Water Level Datums** – NOAA's National Water Level Observation Network (NWLON) provides the framework for the national tidal datum network, an elevation network used for navigation and shoreline boundary purposes. Reference datums, such as the International Great Lakes Datum (IGLD) or Mean Lower Low Water (MLLW) are used for nautical chart products and for definitions of marine boundaries and the national shoreline. NWLON also supports the entire portfolio of NOAA's Navigation Services by providing accurate and reliable tide data to support hydrographic and shoreline mapping surveys.
- **Tide and Tidal Current Predictions** – NOAA is responsible for maintaining and updating the official tide and tidal current prediction tables with data from its deployments of temporary gauges. NOAA's prediction models help to determine maritime conditions in the absence of real-time observations.
- **Marine Charts** – NOAA cartographers compile data from many sources to produce approximately 2,000 nautical charts and products. These products provide for safe vessel navigation in and out of all U.S. ports. NOAA cartographers also supply active leadership and technical expertise to maintain international standards through the International Hydrographic Organization.
- **Research and Development** – NOS continually develops emerging cartographic, hydrographic, and oceanographic systems to advance the science and processes that

underpin NOAA's mapping efforts. The program delivers new survey technologies, software, models, and geospatial products and tools. Specific projects include the National Vertical Datum Transformation tool (VDatum), autonomous underwater vehicles, and support to Ellipsoidally Referenced Surveys. NOAA's Joint Hydrographic Center (JHC) is developing new remote sensing technologies and processes to improve data acquisition, processing, and charting. JHC also supports the delimitation of the U.S. Extended Continental Shelf and sovereign rights beyond 200 nautical miles.

- Navigation Response Teams and Regional Services – Navigation Response Teams conduct hydrographic surveys in inshore areas and conduct rapid response surveys after maritime emergencies or natural disasters. These services minimize costly port closures and draft restrictions during emergencies. NOAA Regional Navigation Managers engage with customers and stakeholders on charting issues and Marine Transportation System infrastructure, which improves NOAA's responsiveness to charting and navigation questions and increases the use of new charting technologies by customers.
- Coastal Mapping – The Coastal Mapping Program (CMP) defines the official 95,000-mile U.S. shoreline that serves as the baseline for defining the Nation's marine territorial limits, including the EEZ. The national shoreline is the single largest data layer for nautical charts and provides geographic reference needed to manage coastal resources, conduct marine planning, adapt to climate change, support emergency response efforts, and integrate NOS mapping activities with partner's mapping data. NOAA delineates the shoreline by processing tidally coordinated, geo-referenced data from stereo aerial photographs and high-resolution satellite imagery. In addition, NOAA's increasing use of aerial topographic-bathymetric (topo-bathy) LIDAR surveys augment shoreline updates and produce digital elevation models. The applications of digital elevation models include coastal inundation modeling, floodplain mapping, coastal zone management, marine debris removal, benthic habitat mapping, and emergency response.
- Physical Oceanographic Real-Time System (PORTS[®]) – PORTS[®] is a decision support tool that integrates real-time environmental observations, nowcasts, forecasts and other information that mariners need to navigate safely. Additional information on PORTS[®] is available in the description of the Tides and Currents Program under Ocean and Coastal Observations.
- Hydrodynamic Models – NOAA provides nowcasts (modeled data for locations where observations are not available) and forecast guidance based on nearby real-time observation data, meteorological forecasts and astronomical predictions. These data on water levels, current, temperature and salinity assist with maritime navigation and coastal planning.

Positioning and Geodesy

NOS's Geodesy program is responsible for defining, maintaining, and providing access to the National Spatial Reference System (NSRS), the common reference framework for establishing the coordinate positions of all geospatial data: latitude, longitude, height, scale, gravity, and orientation. A 2009 study estimated that the NSRS provides more than \$2.4 billion in potential annual benefits to the U.S. economy. The study found that the NOAA Continuously Operating Reference Station (CORS) network alone provides an estimated \$758 million per year in economic benefits. The study estimated that the Nation will realize an additional \$522 million in annual economic benefits by fully implementing a new geoid-based vertical reference system through the Gravity for the Re-Definition of the American Vertical Datum (GRAV-D) initiative, with approximately \$240 million saved from improved floodplain management alone (Socio-Economic Benefits Study: Scoping the Value of CORS and GRAV-D, Levenson 2009).

NOS conducts geodesy and height modernization activities in all 50 states and many U.S. territories. NOS's geodesy products provide the foundational data layer for transportation, mapping and charting, and a multitude of other scientific and engineering applications. The NSRS, as the fundamental geodetic control for the United States, is also an essential component of all national earth observations. The NOAA Geodesy program is continually improving the quality and accessibility of the NSRS to meet growing demand for more accurate positioning services. As the Federal geodetic control theme lead, NOS also participates in the development of international geodetic policy, standards, and guidelines relating to GPS and global navigation satellite systems.

The NOAA Geodesy Program comprises five major overlapping elements:

- Passive Network Infrastructure – A major component of NSRS is a network of over one million permanently marked passive reference points. These monuments form a foundation for all geospatially-referenced activities conducted in the United States.
- Continuously Operating Reference Stations (CORS) – The national CORS Network is a public-private network of permanent global positioning system (GPS) receivers that enables highly accurate positioning relative to the NSRS. NOS provides access to CORS data to the public. NOS also is working to establish a network of NOAA-owned Foundation CORS which link the NSRS to the International Terrestrial Reference Frame (ITRF). Foundation CORS applications include improving forecasts of global sea level rise and informing coastal infrastructure planning.
- Modernization of the Vertical Datum – NOS leads the Nation's efforts to enhance the vertical aspect of the NSRS through its Gravity for the Re-Definition of the American Vertical Datum (GRAV-D) initiative. GRAV-D is a long-term effort to collect gravity data and build the Nation's gravimetric geoid model. This initiative will ultimately lead to new, highly accurate national vertical datum, allowing GPS to establish more accurate elevations for all types of positioning needs. Because GRAV-D will take a number of years to complete, NOAA also conducts height modernization efforts in areas of the country that have critical need for updated height data in response to changing land elevations.
- Data Access and Capacity Building – NOS provides access to geodetic, shoreline, and aerial survey data through the internet, including data from partner organizations. As part of its technology transfer efforts, NOS conducts workshops and hosts constituent forums around the country. NOS also runs the State Geodetic Advisor Program, a cost-shared program that assists 25 states' geodetic and surveying programs. NGS is transitioning to a fully funded regional advisor program that will serve the entire United States.
- Research and Subject Matter Leadership – NOS develops standards, guidelines and best practices for the surveying and positioning industry, as well as a variety of models and programs describing geophysical and atmospheric phenomena that affect spatial measurements. These tools are crucial to scientific and commercial positioning activities. To improve the collection, distribution, and use of spatial data, NOS also conducts cutting-edge applied research and development in geophysics, including geodynamics and geodesy. Current research includes improving the precision of geodetic positions/velocities, automated processing of GPS data for static and/or kinematic positioning, orbital dynamics, sea level rise, crustal motion, GPS antenna characteristics, meteorological effects, and tidal effects.

Ocean and Coastal Observations

In addition to positioning and mapping activities, NOS's ocean and coastal observation programs originate from three interconnected authorizations. The Coast and Geodetic Survey Act authorizes the collection and dissemination of water level data, analyses, and predictions. The Hydrographic Services Improvement Act provided updated authorities for the collection of real-time information and the use of information for coastal resource management. The Integrated Coastal and Ocean Observation System Act (ICOOS Act) charges NOAA with leading oversight and administration of regional observing systems and coordinating across Federal and non-Federal entities to maximize the Nation's return on investment in IOOS. Other relevant legislation includes the Tsunami Warning and Education Act, which directs the use of real-time tide data for tsunami warnings.

Tides and Currents Program

NOAA, through its Tides and Currents Data Program, owns and operates two primary observing systems that the maritime community relies upon for safe and efficient navigation: the National Water Level Observation Network (NWLON) and National Current Program. These two systems and partner data enable NOS to provide observations, now-casts and forecasts that commercial mariners need to navigate safely. U.S. Coast Guard carriage regulations require large commercial vessels to carry NOAA's annual Tide and Tidal Current Prediction tables along with NOAA Nautical Charts. Recreational users and the fishing industry are also among the core users of these products, relying on them to navigate safely and to determine best catch times. Emergency response agencies use NOS's water level predictions and current models for oil spill response.

- Water Level Observations – The NWLON consists of long-term, continuously operating water level stations throughout the coastal U.S., the Great Lakes, and U.S. island possessions and territories. NOAA currently operates 210 of these long-term stations. Information from the NWLON ranges from real-time, high frequency content in the record (e.g., tsunami 1-minute data and storm surge) to long-term datasets (e.g., sea level and lake level trends). NWLON data forms the basis of the vertical reference framework (tidal datums in coastal areas; International Great Lakes Datum in the Great Lakes) for all marine boundary applications (ranging from international-to-Federal- to-state-to-private property), delineation of the national shoreline, nautical chart products, and dredging operations. In addition to navigation and mapping, applications of this water level and vertical datum information include habitat restoration, emergency management, dredging, coastal planning and management, and coastal construction projects.
- Modeling and Forecasting – Where sensors are not present or future data is needed, NOS operates nowcast and forecast models that provide short-term water level and other environmental forecasts. These forecasts are accurate out to 48 hours and enable better planning and decision-making, particularly for vessel transits. NOS presently operates fifteen nowcast/forecast models; twelve models are currently running on the high performance computers at the National Centers for Environmental Prediction (NCEP) and the remaining three will be transitioned to NCEP when they are upgraded or replaced over the next several years. In FY 2014, NOS implemented two new models for San Francisco Bay, CA and nested grid models within the Northern Gulf region. In FY 2015, NOS is also implementing significant infrastructure upgrades to models for Chesapeake Bay, Delaware Bay, and Tampa Bay. These changes will improve performance by taking advantage of the improved infrastructure. In FY 2016, NOS is implementing a new model for Lake Erie, a new model for Cook Inlet, and a West Coast shelf model. Finally, NOS is also developing a model for the Gulf of Maine in FY 2016 for deployment in FY 2017.

- Physical Oceanographic Real Time Systems (PORTS®) – NOS and its partners operate PORTS®, a decision-support tool that integrates and disseminates real-time data and nowcasts on water levels, currents, salinity and meteorological data (e.g., wind, atmospheric pressure, visibility, and air and water temperatures) to mariners and other users. The 23 PORTS® systems in operation serve 50 of the top seaports in the Nation. In some locations, PORTS® also includes sensors for visibility, waves, and bridge clearance. PORTS® is a cost-shared program; local partners – local port authorities, pilot associations, shippers, the U.S. Coast Guard, the U.S. Army Corps of Engineers, the U.S. Navy, academia and others – provide funding for the sensor systems and their ongoing maintenance. NOS provides technical expertise for systems design, 24/7 quality control, data collection and dissemination infrastructure, and ongoing management of the data. A new PORTS® in Jacksonville, Fla., began operating in 2014 and another in Matagorda Bay, TX will begin operations by the end of 2015.

Data and modeling from NWLON and the National Current Program also provide essential information to users outside the navigation community. Examples of user applications include coastal planning, habitat restoration, long-term sea-level assessments, storm-surge monitoring, tsunami warning, emergency preparedness, hydrokinetic energy development, HAZMAT response, and the identification of beneficial uses for dredged material. NWLON and National Current Program data contribute to harmful algal bloom forecasts, a critical component of NOAA's Ecological Forecasting Roadmap. NOAA also defines tidal datums for the United States and maintains the National Tidal Datum Epoch through the Tides and Current Data Program.

Data Integration, Regional Support, and Sensor Development

The United States Integrated Ocean Observing System (U.S. IOOS) program, led by NOAA, serves the dual functions of improving compatibility between Federal and regional observations and providing direct support for regional observing systems. The vision of IOOS is a unified network of Federal and non-Federal observing assets that serve coastal industries and decision-makers. Users of ocean data, including modelers, researchers, and meteorologists, spend an average of 25 to 50 percent of their time searching for, accessing, formatting, and ingesting data into their products. These data management activities require significant resources that might otherwise be used for forecasts and research. By improving the accessibility and interoperability of ocean data, IOOS delivers time and cost savings that can be redirected to improving existing and developing new products. NOAA adheres to international standards used by other countries and entities that provide similar geospatial reference systems and data. Observations by NOS assets and partners are critical components of the U.S. IOOS and the Global Earth Observation (GEO).

The IOOS Regional component complements Federal ocean observations and models and is tailored to the economic and environmental requirements of local communities. NOAA supports regional IOOS associations primarily through cooperative agreements for operations and maintenance, capital investment, and research, development, testing, and evaluation of new sensor equipment and new sensor technologies. IOOS Regional Associations deploy observing assets in accordance with nationally coordinated build-out plans. Recent investments have focused on buoys, gliders, coastal high frequency (HF) radar, animal telemetry (data from electronic tags attached to marine animals) and models to support hurricane storm surge and inundation forecasting. These capabilities protect American lives and support American livelihoods by aiding adaptation, response and resilience to climate change, ocean acidification, spills, extreme weather, and near-shore search-and-rescue requirements.

The U.S. IOOS Marine Sensor Innovation program aims to incorporate the successful marine sensor technologies and observing strategies into IOOS operations and other monitoring and prediction programs. Required coordination among U.S. IOOS Regions, the research community and Federal operational programs will ensure that new technologies and resulting data sources integrate with existing operational models and forecasts. When mature, these technologies will allow rapid, accurate, and cost effective detection, identification, characterization, and quantification of environmental conditions such as ocean acidification and harmful algal blooms.

Hydrographic Survey Priorities/Contracts

This program activity provides funding for contract hydrographic survey services that support NOS's Navigation, Observations and Positioning program activity. See the program activity description for Navigation, Observations and Positioning for program descriptions.

IOOS Regional Observations

This program activity provides extramural grants and cooperative agreements in support of regional observations, which support the Integrated Ocean Observing System, which is part of NOS's Navigation, Observation and Positioning program activity. See the program activity description for Navigation, Observations and Positioning for program descriptions.

Schedule and Milestones:

- Develop Nautical Charting System II—one central database available for all formats of charts by FY 2020
- Implement data archive capability for NOAA charter mapping data from University-National Oceanographic Laboratory System (UNOLS) projects (FY 2016-2020)
- Increase topo-bathymetry shoreline data collection and reach full production levels in FY 2019
- Provide a Method for Real-Time Network (RTN) Operators to validate that their RTNs are aligned with the National Spatial Reference System (FY 2016)
- Complete GRAV-D and release of a gravity-based geoid (FY 2022)
- Partner with NOAA/OAR/Ocean Acidification Program to deploy and operate ocean acidification sensors on regional IOOS platforms (buoys, shore stations, gliders) (FY 2016-2020)
- Initiate competitively selected Marine Sensor Innovation demonstration projects and conduct technology demonstrations and evaluations in U.S. IOOS Regions (FY 2016-2020)
- Transition demonstrated marine sensor tools or technologies into operations (FY 2016-2018)

Deliverables:

- Hydrographic survey backlog reduced by 13,585 SNM from FY 2016 to FY 2019 within navigationally significant areas
- A total of 1,100 Electronic Navigational Charts (ENCs) available to public (FY 2018)
- Maintenance of 175 new editions of Raster Navigational Charts annually, increasing 10 percent each year with a final goal of 250 per year
- Eight new editions of Coast Pilot each annually
- Evaluation and approval of 120 hydrographic surveys conducted by NOAA survey units, contractors, and other sources for nautical charting and other uses (annual)
- Deliver > 95 percent water level data availability (FY 2016-2020)
- Conduct 70 tidal current surveys per year (FY 2016-2020)

- Six seasonal tide gauges per year in support of the International Great Lakes Datum update starting in FY 2017
- GPS satellite orbit analysis and act as the International GNSS Service (IGS) Analysis Center Coordinator to pinpoint the locations of more than 40 GPS and GNSS satellites to ensure the accuracy of satellite-delivered positioning information
- “Quality Assurance of Real Time Oceanographic Data” (QARTOD) manuals for IOOS core variables including temperature, salinity, etc.
- Refined IOOS enterprise metrics for assessing performance and maturity of the system
- High Frequency radar trend analysis of system performance and operational readiness of the system
- Incorporation of two or more emerging tools or technologies into the system within two or more U.S. IOOS regions every three years (FY 2016–2019)

Performance Goals and Measurement Data:

Performance Measure:	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
Percentage of top U.S. Seaports with access to suite of NOAA Navigation Products and Services (ENCs and access to VDatum and NRTs)	74%	74%	74%	74%	74%	74%	74%
Description: The U.S. Army Corps of Engineers tracks the number of vessel transits and cargo tonnage that pass through the approximately 300 ports in the U.S. on an annual basis. Over 95 percent of the annual tonnage passes through the top 175 seaports. By identifying the seaports to which NOAA provides a full suite of its products and services, NOAA can determine what percentage of cargo is benefitting from NOAA navigational products and services.							

Performance Measure:	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
Reduce the hydrographic survey backlog within navigationally significant areas (measure 3.3h)	2,207	2,556	2,717	2,717	2,717	2,717	2,717
Description: NOAA conducts hydrographic surveys to determine bathymetry primarily in U.S. waters significant for navigation. This activity includes the detection, location, and identification of wrecks and obstructions with side scan and multi-beam sonar technology. NOAA uses the data to produce nautical charts in a variety of formats.							

Performance Measure:	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
Update National Shoreline and Priority Ports (Percentage of total per year)	4.2%/17%	4.2%/25%	4.8%/33%	5.4%/33%	6.0%/33%	6.6%/33%	6.6%/33%
Description: Updating the National Shoreline and Priority Ports is a measure NOAA typically uses to capture annual performance of NOAA in-house and contract assets for acquiring shoreline data for navigation safety and other programs.							

Performance Measure: Percent of U.S. and territories enabled to benefit from a new national vertical reference system for improved inundation management (measure 3.3i)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	36%	45%	53%	62%	70%	79%	87%
Description: This measure tracks progress of NOAA's National Geodetic Survey toward completing the Gravity for the Redefinition of the American Vertical Datum (GRAV-D) initiative and implementation of a new National Vertical Datum for a wide variety of applications including improved inundation management. NGS will calculate the percentage of area enabled relative to a pre-defined total area that includes U.S. territorial land and adjacent land and water areas necessary for final determination of a national vertical reference system. The performance measure will be tracked as a percent of the total area that is identified as complete.							

Performance Measure: Percentage of top 175 U.S. Seaports with access to suite of NOAA Navigation Products and Services (CO-OPS contribution by tonnage)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	55%	55%	55%	55%	55%	55%	55%
Description: The U.S. Army Corps of Engineers tracks the number of vessel transits and cargo tonnage that pass through the 300 or so ports in the U.S. on an annual basis. Over 95 percent of the annual tonnage passes through the top 175 seaports. By tracking how many seaports to whom NOAA is providing a full suite of its products and services, one can determine what percentage of cargo is transiting more safely and efficiently. The percentage of seaports can then be correlated with these statistics.							

Performance Measure: Update accuracy of NOAA tidal current predictions (number of locations)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	70	70	70	70	70	70	70
Description: The Coast and Geodetic Survey Act authorizes NOAA to conduct tide and current observations and to analyze and predict tide and current data and publish data, information, compilations, and reports, including short term tidal current surveys that are used to update the NOAA annual tidal current prediction tables. This measure tracks NOAA's progress in updating the accuracy of these predictions by tracking the number of locations that have been updated.							

APPROPRIATION ACCOUNT: OPERATIONS, RESEARCH, AND FACILITIES
SUB-PROGRAM: COASTAL SCIENCE AND ASSESSMENT

The activities under the Coastal Science and Assessment sub-program provide a scientific foundation for sustainable management, protection, and restoration of ocean and coastal resources, especially NOAA's public trust resources. NOS focuses its research capabilities in these programs on understanding, monitoring, predicting and mitigating coastal ecosystem changes that have enormous implications for the Nation's economic well-being. Burgeoning coastal development and increasing climate variability exacerbate stressors on coastal ecosystem services. NOS research and advisory services enable Federal, state, local, and private industry actions to mitigate the cumulative effects of these stressors and enhance resilience. Furthermore, the increasing level of coastal human activity increases the risks of spills, ship groundings and other emergencies that damage sensitive ecosystems. NOS is the Nation's leading scientific expert on response to such emergencies and conducting natural resource damage assessments in oceans and coasts. These assessments support judgments and settlements that fund restoration of public trust resources.

NOS implements the activities of this sub-program under the Clean Water Act; Oil Pollution Act; the Comprehensive Environmental Response, Compensation, and Liability Act; the National Coastal Monitoring Act; the Marine Debris Act; and the Harmful Algal Bloom and Hypoxia Research and Control Act. The research conducted in this sub-program also helps to inform NOAA's activities under the National Marine Sanctuaries Act and the Coastal Zone Management Act. This sub-program also supports NOAA's and the Nation's obligations under international treaties and conventions, and increases effectiveness of international programs for coastal environmental science and technology, integrated coastal zone management, and sustainability of coastal resources. NOAA's Ecological Forecasting Roadmap guides the transition of mature research into operational ecological forecasts, particularly in the areas of harmful algal blooms (HABs), hypoxia, and pathogens.

The following program offices and program office components are responsible for carrying out the Coastal Science and Assessment sub-program:

- **National Centers for Coastal Ocean Science (NCCOS).** NCCOS conducts applied research, monitoring, and assessments to build the scientific foundation for coastal management and resilient coastal ecosystems. NCCOS leverages and enhances its capabilities through partnerships with resource managers nationwide. Current NCCOS focus areas include managing threats of HABs, supporting marine planning, and advancing knowledge of ecological effects of climate change and coastal contamination. The program's engagement with stakeholders ensures that its research activities align with the highest priority national, regional, and local science requirements. NCCOS centers are located in Maryland, South Carolina, North Carolina, and Alaska.
- **Office of Response and Restoration (OR&R).** OR&R is a center of expertise in preparing for and responding to threats to coastal environments: oil and chemical spills, releases from hazardous waste sites, and marine debris. When oil or hazardous substances threaten or injure coastal and marine resources, OR&R is responsible for assessing damage to natural resources and ensuring that cleanup actions protect those resources from further injury. NOAA responds to over 100 significant oil or chemical spills each year as scientific advisors to the U.S. Coast Guard.

The narrative below describes programs funded through the Coastal Science, Assessment, Response and Restoration and Competitive Research program activities.

Coastal Science, Assessment, Response and Restoration

Coastal Science and Monitoring

NOS conducts applied research, monitoring, and assessments to build the scientific foundation for the sustainable use of coastal resources. NOS advances these research priorities both through its laboratories and through grants for competitive, peer-reviewed, interdisciplinary research investigations. This complementary mix of intramural and extramural approaches a seamless science-to-decision connection to between NOS's research programs and its stewardship and technical assistance programs.

NOS's applied science program seeks to understand the physical, biological, and social impacts of coastal management decisions in the face of climate change and increasing use of coastal and ocean resources. A major focus area is response to and recovery from a full range of hazards such as contaminants (including oil, hazardous waste, microplastics and nanoparticles), natural toxins such as those produced by HABs, and contaminants of emerging concern. The resulting products and services support a broad spectrum of coastal ecosystem management needs; examples include modeling of climate change impacts on biological communities and habitats; characterizations and forecasts of coastal, marine, and Great Lakes ecosystem conditions; and impacts assessments of interconnected coastal uses and stressors, including offshore energy development, tourism in National Marine Sanctuaries, and marine aquaculture.

NOS laboratories have the flexibility to address the most current and pressing coastal stewardship research demands from NOAA, states, and territories. For this reason, as restoration in the wake of the Deep Water Horizon spill continues, NOAA has located the RESTORE Act Science Program within NCCOS. Furthermore, NOS intramural research programs are well positioned to conduct long term monitoring and maintain standardized, longitudinal datasets. These long time scale activities enable NOS to contribute to climate science in specific areas such as the characterization of climate sensitivity of selected coastal ecosystems using community vulnerability and biophysical indicators. The research in these areas enable NOS to develop tools and protection measures aimed at assessing and mitigating climate change and ocean acidification impacts on NOAA-supported marine protected areas (NERRs and sanctuaries).

NCCOS grantees and collaborators conduct multi-disciplinary studies on mission-critical scientific questions and coastal environmental issues. These studies include understanding and predicting the impacts of natural and anthropogenic stressors on coastal ecosystems, communities, and economies. Merit-based awards of multi-year cooperative agreements funded through the Competitive Research program often address specific coastal management needs on a regional scale and benefit significantly from subject matter expertise of the most qualified teams of scientists in the Nation, whether they are in academic institutions, private industry or other government laboratories. Grantee research often culminates with the development of models that predict how ecosystems will respond to stressors and interventions.

Response and Restoration of NOAA Trust Resources

NOS's emergency preparedness and response capabilities support Federal, state, and local agencies across the country. These agencies depend on NOAA's science-based guidance and training to minimize environmental and economic impacts during oil and chemical spills, vessel groundings, hazardous waste releases, search and rescue efforts, and national security events. NOAA also addresses persistent coastal hazards, including marine debris. NOS emergency services include oil spill trajectory modeling, shoreline cleanup assessment, identification of

sensitive resources, information management, and development of cleanup strategies. NOS continues to provide critical scientific support to the U.S. Coast Guard for the Deepwater Horizon oil spill in the Gulf of Mexico.

After the initial response to a pollution event or grounding, NOS and other natural resource trustees are responsible for determining the extent of damages to natural resources and seeking compensation on behalf of the public for the loss of ecosystem services. NOS also ensures that cleanup actions protect resources from further injury. NOS's Assessment and Restoration Program is a leader within the natural resource damage assessment community. To date the program and its Federal and state partners have generated over \$500 million of restoration resources from responsible parties.

NOS continues to lead the damage assessment activities for the 2010 Deepwater Horizon oil spill in the Gulf of Mexico. Along with the assessment work, NOS and the NOAA Restoration Center are assisting affected communities with estuary habitat restoration and the developing restoration monitoring capabilities. NCCOS research under this sub-program is also essential to establishing a baseline of ecosystem conditions before the pollution event, enabling the trustees and the responsible party to quantify the damage and evaluate long-term restoration projects.

NOS's oil spill research and development program conducts research to provide tools and training for planners, oil spill responders, and assessment practitioners. For example, NOS has improved a chemical reactivity model, the General NOAA Operational Modeling Environment (GNOME) model for sub-surface oil spills and marine debris, and the Computer Aided Management of Emergency Operations (CAMEO) suite of products. Other projects include a study to evaluate spill cleanup technologies and oil impacts in marshes, a tool for operational use of hydrodynamic models from multiple sources, and methodologies for extrapolating acute toxicity from existing data.

NOS, through its Marine Debris Program (MDP), has a lead role in addressing marine debris affecting the ocean and coastal environment and navigation safety in the United States. The program scope comprises reduction, prevention, research, monitoring, and some removal activity. Current activities emphasize research and the establishment of standardized monitoring protocols. NOAA chairs the Federal Interagency Marine Debris Coordinating Committee and leads the Federal community on marine debris issues.

Competitive Research

This program activity provides funding for extramural research grants in support of NOS's Coastal Science, Assessment, Response and Restoration program activity. See the program activity description for Coastal Science, Assessment, Response and Restoration for program descriptions.

Schedule and Milestones:

- Develop and enhance sea level rise forecast modeling systems for the northern Gulf of Mexico and other priority regions to inform coastal planning, restoration and protection of economic interests in the face of long-term sea level rise (FY 2016 – 2017)
- Develop a pilot GIS-based modular data integration framework for ecological forecasting
- Develop and enhance sea level rise forecast modeling systems for the northern Gulf of Mexico and other priority regions to inform coastal planning, restoration and protection of economic interests in the face of long-term sea level rise (FY 2016 – 2017)
- Develop methodologies to incorporate seasonal river flow forecasts into hypoxia forecasts (FY 2016)

- Develop concept of operations for scenario-based hypoxia forecasts. (FY2016 – 2017)
- Transition Lake Erie, and Gulf of Maine HAB forecasts to operations (FY 2016 – 2020)
- Complete development of test kits for key HAB species, and transition detection and monitoring technologies into forecasting systems and state monitoring (FY 2016 – 2017)
- Complete evaluation of four new Vibrio forecasts for transition to operations (FY 2016)
- Collect observations necessary to develop and improve forecasts (e.g. ship-based observing to initiate seasonal forecasts and increased salinity measurements to improve hydrodynamic models) (FY 2015-2018)
- Support RESTORE Act Science Program through competitive research grants and other means of financial assistance.(FY 2016 – 2019)
- Train 1000 responders and partners (Federal, state and local) in technical and scientific elements of incident response and damage assessment (FY 2016-2020)
- Develop Marine Debris Rapid Response Plans with partners in the Gulf of Mexico, the Southeast and the Northeast, as outlined in the Marine Debris Act 2012 reauthorization (FY 2016-2020)
- Conduct or participate in three joint and international oil spill pollution trainings/exercises per year by FY 2017

Deliverables:

- Baseline ecological assessments in the Gulf of Mexico, Chesapeake Bay and select sanctuaries and NERRs
- Multidisciplinary ecological model to evaluate marsh, oyster, and sea grass response to sea level rise in selected locations of the Gulf of Mexico
- Operational HAB forecasts in Gulf of Mexico (Texas and West Florida Shelf), Lake Erie, and Gulf of Maine
- Operational ensemble seasonal hypoxia forecast for the Gulf of Mexico
- Validated pathogen forecasts in the Chesapeake Bay
- Coupled regional biophysical model for understanding population connectivity between Pulley Ridge and Florida Keys ecosystems
- Two regional response exercises per quarter with NOAA presence (Federal, state, local, private)
- Enhanced functionality of Environmental Response Management Application (ERMA)
- Up to five research projects funded annually that address priority marine debris research and development focus areas

Performance Goals and Measurement Data:

Performance Measure: Annual number of coastal, marine, and Great Lakes ecosystem sites adequately characterized for management (Measure 3.3c) (NCCOS contribution only)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	13	13	10	10	10	10	10
Description: Ecological characterizations provide the scientific basis for coastal and ocean assessments and forecasts, and the development of plans to manage resources and assess the effectiveness of measures implemented to effectively manage natural resources. Characterizations are conducted on NOAA trust resources, essential fish habitats, Great Lakes habitats and living resources and throughout the Nation’s coastal zone.							

Performance Measure: Cumulative number of coastal, marine, and Great Lakes forecast capabilities developed and used for management (Measure 3.3d) (NCCOS contribution only)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	6	8	8	9	10	11	12
Description: NOAA’s discrete forecast models allow resource managers to: 1) make decisions based on predicted environmental and socioeconomic impacts related to a particular issue; 2) use issue-based forecasts to predict the impacts of a single ecosystem stressor; and 3) evaluate the potential options to manage or mitigate those stressors. These forecasts are counted as a distinct capability for a distinct ecosystem as they become operational. For example, harmful algal bloom forecasts in the Gulf of Mexico and Gulf of Maine are two separate forecast capabilities. Similarly, distinct forecast capabilities are counted within a single ecosystem (i.e., harmful algal blooms, pink shrimp harvest, and hypoxia –all in the Gulf of Mexico).							

Performance Measure: Percent of all coastal communities susceptible to harmful algal blooms verifying use of accurate HAB forecasts (Measure 3.3j)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	11	11	11	11	11	11	11
Description: This measure tracks the forecast communities (currently using operational forecasts) within a coastal region vulnerable to harmful algal blooms (HAB) and the utility and accuracy of HAB forecasts as verified through customer feedback responses before and after a forecast HAB event.							

Performance Measure: Number of responders (Federal, state, local) trained in technical and scientific elements of incident response (SCAT, SOS, ERMA, CAMEO, etc.)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	2,000	2,000	2,000	2,000	2,000	2,000	2,000
Description: This measure tracks the number of emergency responders (Federal, state, local) trained by OR&R in technical and scientific elements of incident response (SCAT, SOS, ERMA, CAMEO, etc.).							

Performance Measure: Metric tons of marine debris removed annually	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	450	400	400	400	400	400	400
Description: This measure reflects the metric tons of marine debris removed from coastal areas as a direct result of NOAA funding. [NOTE: The target is reduced for future years to reflect the shift in the Fishing for Energy Partnership from removal to prevention. Also, while this is an important metric for Marine Debris, it is important to note that weight is only part of the picture.]							

Performance Measure: Number of Natural Resource Damage Assessment cases where liability is resolved	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	4	5	5	5	5	5	5
Description: This measure tracks the annual number of natural resource damage cases that are resolved through judgments and settlements and supply restoration funds. Successful cases reflect NOAA's ability to conduct assessments, provide assistance and work cooperatively with industry and other trustees on natural resource damage cases. Note: These targets represent a reasonable expectation based on available budget resources and the historical moving average. Natural Resource Damage Assessment (NRDA) settlements in any specific year are hard to predict as they hinge on external factors beyond NOAA's control.							

PROGRAM CHANGES FOR FY 2016:

Coastal Science, Assessment, Response and Restoration: Arctic Spill Preparedness (Base Funding: \$72,600,000 and 294 FTE; Program Change: +1,300,000 and 0 FTE): NOAA requests an increase of \$1,300,000 and 0 FTE for a total of \$73,900,000 and 294 FTE for Coastal Science, Assessment, Response and Restoration to improve NOAA's scientific and operational support for Arctic oil spill response.

Proposed Actions:

NOAA is proposing to fill critical science and data gaps to address NOAA obligations for Arctic oil spill response under the National Contingency Plan (NCP) (40 CFR §300.145(c)). The Plan calls for NOAA to provide scientific support on oil cleanup to the Federal On-Scene Coordinator. Industrial interest in the Arctic will continue as companies pursue exploratory drilling and marine transportation system (MTS) activities in the region. This proposal directly addresses oil spill-related implementation actions in the National Strategy for the Arctic Region to prevent loss of life and to reduce environmental risk, while facilitating sustainable Arctic economic development. Specifically, this investment will improve NOAA models to predict oil movement and weathering in ice-covered waters; assess vulnerable habitats and species; improve coordination with and preparedness of local communities; improve remote field observation and assessment capabilities; build Arctic oil spill response safety, capacity and efficacy; support interagency Arctic development planning and preparedness efforts; and fund research to fill scientific gaps in the emergency response continuum.

Statement of Need and Economic Benefits:

The United States, by virtue of the State of Alaska, is a maritime Arctic nation and has substantial interests in the region. Climate change is driving rapid sea ice loss in the Arctic, with some empirical estimates predicting the complete loss of summer sea ice within the next 20 years. This drastic change in the physical environment is helping to spur a sharp increase in Arctic economic activity, especially in the areas of maritime commerce and natural resource extraction. Despite the Arctic's remote location relative to the contiguous U.S., its economy affects the entire Nation through domestic petroleum production, facilitating trade with global markets, and as a source of seafood.

Numerous high level policy statements have attested to the increasing importance of the region including the 2013 National Strategy for the Arctic Region, the President's Report on Integrated Arctic Management, the Committee on the Marine Transportation System, the 2013 U.S. Arctic Marine Transportation System Overview and Priorities for Action, and the recently signed Arctic Council Agreement on Cooperation on Marine Oil Pollution Preparedness and Response in the Arctic. These new drivers, combined with recent policy decisions, underscore the need for NOAA actions that facilitate safe and efficient navigation, prevent loss of life and property, and reduce the risk of environmental damage in the region, while facilitating economic development and employment.

A U.S. Geological Survey assessment estimates that the Arctic may contain 22 percent of the world's undiscovered, technically recoverable oil and gas resources – a projected 84 percent of which would occur offshore. In 2013, there were 673 active Arctic Alaska Outer Continental Shelf (OCS) oil and gas leases, with additional sales planned for 2017. The safety and financial risk of such ventures will depend heavily on NOAA-provided data as traffic increases for vessels that supply drill sites, move resources from site to customer and, in the event of an incident, support a spill response or other emergency.

The Marine Exchange of Alaska reports that total commercial vessel traffic for all uses increased by 30 percent in the Arctic region from 2008 to 2010. Growing use of these trans-Arctic routes and their dependence on the Bering Strait will lead to increased traffic in U.S. Arctic waters, and increased risk of oil spill and injury to people, places and living marine resources. An estimated 26 percent of the jobs in Alaska depend on a healthy environment.¹

Resource Assessment:

NOS has current resources of \$634,000 in Coastal Science, Assessment, Response and Restoration to support Arctic oil spill response capacity in recognition of the expanding activity there. The NOS Office of Response and Restoration (OR&R) also maintains a scientific support coordinator for Alaska, and limited Natural Resource Damage Assessment (NRDA) capacity at a level of \$500,000.

Schedule and Milestones:

Milestones	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
Improved trajectory models for Beaufort/Chukchi Seas			X	X	
Environmental Sensitivity Index (ESI) Map Update - NW Arctic, North Slope		X	X		

Deliverables:

- Ensure adequate training and equipment as recommended by OR&R’s FY 2015 Arctic safety assessment which identified equipment and training needs unique to the region, including aviation safety and cold weather survival training
- Significantly enhanced incident response capability for Arctic Ocean, Bering Sea and Gulf of Alaska to support the U.S. Coast Guard
- Updated Arctic operational oceanography models and oil fate and behavior models to include oil-in-ice behavior to support oil spill response
- Updated Environmental Sensitivity Index maps to reflect current resources at risk (northwest Arctic, North Slope)
- NOAA staff have adequate training and experience to provide support for the tasks identified under the National Contingency Plan
- Timely and thorough environmental review of oil spill response plans through the interagency review process
- Research projects implemented to determine the concentrations of mixtures of oil and dispersants that could be expected to adversely impact populations of Arctic cod, as well as determining how long such potential impacts would persist

¹ UNEP. *GEO-3: GLOBAL ENVIRONMENT OUTLOOK*. Rep. 2002. www.unep.org/geo/geo3/English/133.htm

Performance Goals and Measurement Data:

Performance Measure: Number of joint and international oil spill pollution trainings/exercises conducted or participated in by NOAA	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	1	2	3	3	3
Without Increase	0	0	0	0	1	0	0
Description: This tracks the number of joint and international oil spill pollution trainings and exercises that NOAA will participate in and/or conduct.							

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Program: National Ocean Service
Sub-program: Coastal Science and Assessment
Program Change: Arctic Spill Preparedness

Object Class		FY 2016 Increase	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$25,560
11.3	Other than full-time permanent	0	909
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	0	26,469
12	Civilian personnel benefits	0	7,860
13	Benefits for former personnel	0	5
21	Travel and transportation of persons	0	907
22	Transportation of things	0	122
23.1	Rental payments to GSA	0	1,497
23.2	Rental Payments to others	0	321
23.3	Communications, utilities and miscellaneous charges	0	2,077
24	Printing and reproduction	0	26
25.1	Advisory and assistance services	0	4,126
25.2	Other services	0	3,468
25.3	Purchases of goods & services from Gov't accounts	0	19,207
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	6
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	1,113
31	Equipment	0	1,799
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	1,300	4,892
42	Insurance claims and indemnities	0	3
43	Interest and dividends	0	2
44	Refunds	0	0
99	Total obligations	\$ 1,300	\$73,900

Coastal Science, Assessment, Response and Restoration: Emergency Preparedness Training (Base Funding: \$2,500,000 and 2 FTE; Program Change: -\$1,300,000 and 0 FTE):

NOAA requests a decrease of \$1,300,000 and 0 FTE for a total of \$1,200,000 and 2 FTE to reduce training and preparedness activities at the Gulf of Mexico Disaster Response Center (DRC).

NOAA will use nonrecurring FY 2015 funding to conduct several training activities at its Gulf of Mexico Disaster Response Center, including Incident Command System training, a NOAA all-hazard response drill and training, spill response observing training, Science of Spills training, risk communications and media training, and Gulf NERRS disaster response planning drills and trainings. These activities will conclude at the end of FY 2015 after training more than 300 emergency and recovery responders and conducting an all hazards threat risk assessment. With the requested resources in FY 2016, NOAA will continue critical support and training of first responders for emergency response and restoration in the high-risk Gulf region.

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Program: National Ocean Service
Sub-program: Coastal Science and Assessment
Program Change: Emergency Preparedness Training

Object Class		FY 2016 Increase	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$25,560
11.3	Other than full-time permanent	0	909
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	0	26,469
12	Civilian personnel benefits	0	7,860
13	Benefits for former personnel	0	5
21	Travel and transportation of persons	0	907
22	Transportation of things	0	122
23.1	Rental payments to GSA	0	1,497
23.2	Rental Payments to others	0	321
23.3	Communications, utilities and miscellaneous charges	0	2,077
24	Printing and reproduction	0	26
25.1	Advisory and assistance services	0	4,126
25.2	Other services	(1,300)	2,168
25.3	Purchases of goods & services from Gov't accounts	0	19,207
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	6
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	1,113
31	Equipment	0	1,799
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	3,592
42	Insurance claims and indemnities	0	3
43	Interest and dividends	0	2
44	Refunds	0	0
99	Total obligations	\$ (1,300)	\$71,300

* Due to financial system limitations, the object class detail for the program reflects the full Coastal Science, Assessment, Response and Restoration PPA

Competitive Research: Competitive Research (Base Funding: \$9,000,000 and 3 FTE; Program Change: +\$4,000,000 and 0 FTE): NOAA requests an increase of \$4,000,000 and 0 FTE for a total of \$13,000,000 and 3 FTE to expand competitive research grants that address coastal ocean issues across NOAA's mission responsibilities including harmful algal blooms, hypoxia, and coastal ecosystem research and assessment.

Proposed Actions:

With this increase, NOAA will expand and accelerate its competitive research grants program to improve development of ecological prediction tools and expand research and development of integrated geophysical and socioeconomic tools. The program addresses accelerating threats of Harmful Algal Bloom (HAB), hypoxia, sea level and land use change, and aims to better understand and predict the combined effects of environmental stressors on coastal communities, ecosystems, and economies. NOAA will continue to focus on the Nation's highest priority research needs of forecasting the ecological effects of stressors on coastal ecosystems and applying that information toward proactive management. The National Centers for Coastal Ocean Science (NCCOS) supports competitive, peer-reviewed, interdisciplinary research investigations with finite life cycles conducted on a regional ecosystem scale over a 3-5 year period. The grants would fill the gap between development of ecological predictive tools and actual management application.

Statement of Need and Economic Benefits:

Harmful algal blooms, hypoxia, climate change, and other ecosystem stressors negatively affect human health, impair coastal ecosystems, and can severely limit community economic and environmental sustainability. A single harmful algal bloom event can cause up to \$25 million in losses to coastal economies that rely on recreation, tourism, and seafood harvesting. These economic and resource impacts are increasing dramatically in many areas, thus increasing the demand for relevant, comprehensive, and actionable science. NCCOS competitive funding of research and applied science provides the information and tools coastal managers need to combat and mitigate the accelerating decline of the ecosystems and living resources under their purview. Funded activities will directly support NOAA's program authorizations including the Harmful Algal Bloom and Hypoxia Research and Control Act, the Coastal Zone Management Act, and the National Coastal Monitoring Act, and also will respond to Administrative ocean and coastal policy priorities including in the Great Lakes and Chesapeake Bay.

Resource Assessment:

Coastal Science and Assessment competitive funds support ecosystem research and assessment, focusing on climate change impacts, harmful algal blooms, hypoxia, and research to understand ecosystem services and support ecosystem management. There are approximately 50 ongoing projects managed by NCCOS, representing a life-cycle investment of about \$87 million, involving over 400 investigators at partner research institutions and management agencies. Together, these efforts are leading to rapid advances in the capacity of NOAA and coastal managers to understand, respond to, and mitigate the impacts of ecosystem stressors such as harmful algal blooms, hypoxia, sea level rise, nutrient pollution and coral reef declines. Key advances include: the development and transition to application of an advanced harmful algal bloom forecasting system; the capability to predict hypoxia and its impacts in the Nation's most important water bodies to guide ecosystem-level management; the development of tools to incorporate the ecological effects of sea level rise into planning scenarios; harmful algal bloom detection tools that are protecting public safety and allowing harvesting of economically valuable shellfisheries; and tools allowing managers to evaluate the trade-offs and linkages between watershed development and impacts to coastal ecosystems. Additional resources for this activity are described in the Coastal Science and Assessment narrative.

Schedule and Milestones:

Address emerging challenges in coastal resilience

- Expand the Ecological Effects of Sea Level Rise (EESLR) program competition by competitively awarding regional research proposals that advance application of sea level rise forecast tools to increase coastal resilience (FY 2017 – 2020)
- Develop new program component to EESLR to expand research and development of integrated geophysical and socioeconomic tools to assess and promote coastal resilience in response to coastal inundation and sea level rise (Program component developed in FY 2017; EESLR competition in FY 2018; awards issued from FY 2019 – 2021)

Address emerging challenges from HABHRCA

- Develop new regional “Management Application” component to FY 2017 HAB Prevention, Control, and Mitigation (PCMHAB) competition aimed to ensure management application of HAB predictive tools (Program component developed in FY 2016; competition in FY 2017; awards issued from FY 2018 – 2020)
- Develop new program to assess the socioeconomic impacts of HABs and hypoxia to coastal communities on a regional scale (Program developed in FY 2017; competition in FY 2018; awards issued from FY 2019 – 2021)
- Develop new regional “Management Application” component to FY 2019 Coastal Hypoxia Research Program competition aimed to ensure management application of hypoxia predictive tools. (Program component developed in FY 2019; competition in FY 2020; awards from FY 2020 – 2023)

Deliverables:

- Newly developed sea level rise predictive models, visualization tools, and socioeconomic models used by managers to evaluate natural and nature-based infrastructure strategies for maximizing coastal resiliency in 2-3 coastal regions (2020)
- Seasonal and weekly HAB and hypoxia forecasts for Pacific Northwest outer coast and Puget Sound disseminated to management, and system is evaluated by the Ecological Forecast Roadmap for possible operationalization (FY 2020)
- Management application of HAB ecosystem predictive models in two or more new regions per year and hypoxia models in two or more new regions per year is used to protect public and animal health or to inform mitigation strategies (FY 2018 – 2020)
- Actionable and user friendly social and economic modeling tools developed to assess effects of HABs and hypoxia in two or more regions each (FY 2020)

Performance Goals and Measurement Data:

Performance Measure:	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
Cumulative number of coastal, marine and Great lakes forecasts capabilities developed and used for management (Measure 3.3d) (NCCOS contribution only)	Actual	Target	Target	Target	Target	Target	Target
With Increase	N/A	N/A	8	10	14	17	18
Without Increase	6	8	8	9	10	11	12

Description: NOAA’s discrete forecast models allow resource managers to: 1) make decisions based on predicted environmental and socioeconomic impacts related to a particular issue; 2) use issue-based forecasts to predict the impacts of a single ecosystem stressor (e.g., climate change, extreme natural events, pollution, invasive species, and land and resource use) and 3) evaluate the potential options to manage those stressors to fulfill the ultimate goal for resource managers to use NOAA’s forecasts to better manage ecosystem use, condition, and productivity. These forecasts will be based on field and laboratory studies, existing data, and models predicting environmental conditions under different scenarios, will have capabilities specific to a geographic area, and be counted for each ecosystem as they become operational. For example, harmful algal bloom forecasts in the Gulf of Mexico and Gulf of Maine are two separate forecast capabilities and similarly, multiple, distinct forecast capabilities could be counted within a single ecosystem (e.g., harmful algal blooms, pink shrimp harvest, and hypoxia—all in the Gulf of Mexico).

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Program: National Ocean Service
Sub-program: Coastal Science and Assessment
Program Change: NCCOS Competitive Research

Object Class		FY 2016 Increase	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$250
11.3	Other than full-time permanent	0	9
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	0	259
12	Civilian personnel benefits	0	76
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	10
22	Transportation of things	0	1
23.1	Rental payments to GSA	0	45
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and miscellaneous charges	0	10
24	Printing and reproduction	0	1
25.1	Advisory and assistance services	0	8
25.2	Other services	0	0
25.3	Purchases of goods & services from Govt accounts	0	240
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	1
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	30
31	Equipment	0	168
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	4,000	12,151
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	\$ 4,000	\$13,000

APPROPRIATION ACCOUNT: OPERATIONS, RESEARCH, AND FACILITIES
SUB-PROGRAM: OCEAN AND COASTAL MANAGEMENT AND SERVICES

Activities and programs under the Ocean and Coastal Management and Services sub-program employ a diverse range of place-based, regional and national approaches to achieve sound management and sustainable use of coastal and marine resources. NOAA's authorizations in these areas emphasize the economic, ecological, cultural, historic and esthetic values of places.

Within this sub-program, NOS employs a range of approaches that emphasize inter-governmental collaboration: partnerships, capacity building, applied science, incentives, regulation, and direct management. NOS collaborates in these areas with Federal, state, tribal, local, and private entities to achieve national goals. NOAA conducts these activities under the Coastal Zone Management Act; National Marine Sanctuaries Act; the Coastal Zone Act Reauthorization Amendments of 1990 (the Coastal Nonpoint Pollution Control Program); the Department of Commerce, Justice, and State Appropriations Act of 2002; the Omnibus Public Land Management Act; the Ocean Thermal Energy Conversion Act and the Deep Seabed Hard Mineral Resources Act; the Ocean and Coastal Mapping Integration Act; Executive Order 13158 on Marine Protected Areas; and Presidential Proclamations 8031 and 8337.

The following program offices and program office components are responsible for carrying out the Ocean and Coastal Management and Services sub-program:

- **Office for Coastal Management (OCM).** OCM is responsible for supporting states' development and implementation of their Coastal Zone Management programs and National Estuarine Research Reserve management plans. This support includes delivery of a comprehensive suite of applied tools, technical and policy assistance, and training resources to a range of coastal partners to address resource management challenges. The office also administers and supports NOAA's Digital Coast Partnership, the Coastal Storms Program, the Coral Reef Conservation Program, Regional Ocean Partnerships, and the Ocean Thermal Energy Conversion Act and the Deep Seabed Hard Mineral Resources Act.
- **Office of National Marine Sanctuaries/ National Marine Protected Areas Center.** This merged program office is responsible for the direct management of the National Marine Sanctuary System and the Papahānaumokuākea Marine National Monument. The program facilitates public and private uses of the resources of special places that are compatible with resource protection and conservation. The office is also responsible for developing a national system of marine protected areas, which includes sanctuaries, to advance national conservation goals and to identify additional areas in need of protection.

The narrative below describes programs funded through the Coastal Zone Management and Services and Coastal Management Grants program activities.

Coastal Zone Management and Services

Coastal states and local governments are essential to fostering resilient coastal communities and managing natural resources. The challenges associated with coastal resilience are increasing with increasing use of ecosystem services and complicated by a changing climate. Voluntary partnerships between NOAA and coastal and Great Lakes states form the basis of NOS's approach under the Coastal Zone Management Act (CZMA). NOAA provides financial assistance, policy guidance, coordination and leadership, technical assistance, and other support to implement 34 state coastal zone management programs. The CZMA also authorizes

NOAA to support research, monitoring, education, training and stewardship at 28 National Estuarine Research Reserves.

The Coastal Zone Management (CZM) Program helps states with balance competing demands for resource use, economic development, and conservation along the Nation's coasts. The 34 (out of 35 eligible) state-led coastal management programs protect more than 61,000 miles of ocean and Great Lakes coastline and cover 99 percent of the U.S. coastal population. NOS administers the CZM Program at the Federal level, approving state coastal management plans and policies and providing technical assistance for their implementation. NOS also assesses the performance of each state program approximately every five years, measuring the progress of individual state programs and the national program toward their respective goals. Through their CZM programs participating states ensure that Federal agency activities are consistent with enforceable policies of state coastal management programs.

NOS supplements its policy support and technical assistance to CZM states with financial assistance in the form of Coastal Zone Management Grants. States may spend these funds on a broad range of approved activities under the CZMA, including coastal planning and permitting, habitat conservation and restoration, protection of life and property from coastal hazards, public access to the coast for recreation, and urban waterfront and port revitalization. NOS allocates the majority of CZM Grant funding using a formula based on shoreline mileage (60 percent) and coastal population (40 percent) of each state. NOS also competitively awards a portion of the Coastal Zone Enhancement funding (Section 309 CZMA) for projects of special merit. States match most of the CZM Grants on a 1:1 basis.

The Regional Coastal Resilience Grants program, in its first year of execution in FY 2015, is building the resilience of coastal communities and ecosystems to negative impacts from extreme weather, climate hazards, coastal inundation, and changing ocean conditions. The program prioritizes actions that bring together regional partners including states, tribes, local governments, and public/private partnerships to address shared risks and vulnerabilities. Program priorities include 1) improved access to and understanding of information regarding current and future environmental, economic and social conditions; 2) enhanced capacity to incorporate this information into decision making; and 3) implementation of projects and actions at the regional or community level that enhance preparedness, recovery, and adaptation to the adverse effects of extreme events and changing conditions.

The Gulf Coast Ecosystem Restoration Council leverages NOS expertise in socioeconomic analysis, vulnerability assessment and resilience planning in its execution of the RESTORE Act. NOAA is collaborating with the Federal Emergency Management Agency, U.S. Army Corps of Engineers, and the Department of Housing and Urban Development to develop a consistent suite of resilience principles for development and redevelopment in coastal areas. Also included in NOS's suite of coastal services is a partnership to plan and execute habitat conservation activities with NOAA's Office of Habitat Conservation and the Department of Interior's Landscape Conservation Cooperatives.

Coastal Management Grants

This program activity provides funding for cooperative agreements with states in support of the Coastal Zone Management Program. It also includes the Regional Coastal Resilience Grant program. See the program activity description for NOS's Coastal Zone Management and Services for program descriptions.

Coral Reef Program

NOS's Coral Reef Conservation Program (Coral Program) brings together multidisciplinary expertise from over 30 NOAA offices and partners with state, jurisdictional and international coastal resource managers to protect, conserve, and restore coral reefs. Coral reefs are some of the most biologically diverse ecosystems in the world. They provide a range of economic benefits and vital ecosystem services: food, recreation, marine habitat, medicines, coastal protection, climate regulation, and maintenance of genetic diversity. A study in 2009 estimated the average annual value of these ecosystem services at \$130,000 per hectare of reef, reaching \$1,200,000 in some cases.² Therefore, declines in coral reef habitats have dire consequences for approximately 500 million people who depend on them for their livelihoods.³

Nineteen percent of the world's reefs are effectively lost⁴ and up to 75 percent either are under threat or seriously threatened with loss in the next few decades. Threats include unsustainable fishing, climate change, and land-based sources of pollution⁵. In response to these threats NOAA's Coral Program invests in ecosystem-based management initiatives to build marine protected area (MPA) management capacity; to monitor, model and forecast climate-related risks and vulnerabilities to coral reefs; and to foster partnerships to address and reduce impacts of land-based sources of pollution. In addition, the program's educational efforts foster public engagement on the importance of conserving coral reef ecosystems.

To date, the Coral Program has integrated coral protection efforts across NOAA. NOAA and more than 170 partner agencies and organizations have mapped over 50 percent of shallow reef ecosystems in U.S. jurisdictions, established approximately 200 operational and experimental coral bleaching alert stations, and developed watershed management plans in over 85 percent of U.S. jurisdictions with coral reef habitats. These collaborations have assessed marine protected area management effectiveness, increased reef managers' monitoring and response efforts on coral bleaching events, and addressed land-based sources of pollution from over 200 square miles that discharge to six high priority coral reef sites.

National Estuarine Research Reserve System

The National Estuarine Research Reserve System (NERRS) is a national network of state-managed protected areas established under the Coastal Zone Management Act. NERRS sites provide long-term protection, serve as "living laboratories" for research, and create opportunities for public awareness and education. The 28 reserves in 22 states and territories protect over 1.3 million acres of state-owned estuarine lands and waters. Reserve sites represent the diversity of estuarine systems of the United States and are economically significant areas for recreation, fishing, and ecotourism.

NOAA provides funding assistance, national guidance and technical assistance, while state agencies or universities perform day-to-day management of each reserve with input from local partners. NOAA funds site-specific programs as well as system-wide activities. Federal NERRS funding (70 percent) is matched by the states (30 percent) for reserve operations, research,

² The Economics of Ecosystems and Biodiversity (TEEB), 2009.

³ Wilkinson, C. *Status of Coral Reefs of the World*, 2008.

⁴ Wilkinson, C. *Status of Coral Reefs of the World*, 2008.

⁵ Burke et al. *Reefs at Risk Revisited*, 2011.

monitoring, training, education and facilities construction. Federal NERRS funding (50 percent) for land acquisition is also matched by the states (50 percent).

Reserves enable improvements in resource management by providing baseline reference sites and testing grounds for resource management and restoration practices. Additionally, NERRS programs monitor coastal water quality and habitat changes toward a better understanding of the impacts of stressors on significant estuarine habitats. The NERRS Science Collaborative funds research projects that grantees conduct on complex resource management issues in close consultation with intended users of the research products. Scientists working in NERRS have contributed to more than 300 peer-reviewed scientific publications since FY 2000. Research and monitoring data inform stakeholders such as coastal managers, shellfish growers, public health officials, search and rescue personnel, and recreation users.

As each reserve site is unique for its ecological and conservation characteristics, the reserve system is invaluable for professional training and education. Coastal decision-makers participating in reserve-based training gain practical information to inform estuarine management at the local and regional level. In the last year alone, reserves organized training to more than 10,000 coastal decision-makers in communities across the Nation.

Sanctuaries and Marine Protected Areas

National Marine Sanctuaries

Under the National Marine Sanctuary Act, NOS manages and operates the Nation's system of 13 designated marine sanctuaries and the Papahānaumokuākea Marine National Monument. The sanctuaries range in size from one square mile near Cape Hatteras, North Carolina, to over 13,500 square miles in the waters off America Samoa. Together, these sanctuaries and the Monument encompass over 172,000 square miles of special marine places. Unique sanctuaries habitats include deep ocean and near-shore coral reefs, live bottom, whale migration corridors, deep-sea canyons, areas of deep water upwelling, submerged banks that rise close to the ocean surface, kelp forests, and sea grass beds. The sanctuary system also protects maritime heritage assets such as shipwrecks.

Individual sanctuary and monument offices are responsible for the system's daily operations and a wide variety of education, research, monitoring and management activities. They develop, implement, and systematically review comprehensive place-based management plans as well as administer local research and monitoring programs. Individual offices coordinate cultural resource programs, education and outreach activities, volunteer programs, and citizen advisory councils. They also coordinate through partnerships to enforce sanctuary regulations and permit otherwise prohibited activities to enable valuable research and education opportunities;

Sanctuaries' national and regional offices provide overall programmatic oversight and guidance to ensure that the National Marine Sanctuary System (NMSS) operates as an integrated system that has greater national impact than the sum of the individual sites. Headquarters functions include system-wide research, monitoring, and outreach programs; review and revisions of existing management plans; evaluation of new sites; and overall policy development and program direction. Sanctuaries' regional offices serve as hubs for program integration with NOAA's evolving ecosystem approach to management. Sanctuary regions coordinate programs and assets among the sites, build partnerships with regional stakeholders and facilitate Federal interagency regional activities.

Marine Protected Area Coordination

The NOAA Marine Protected Areas (MPA) Center uses the Framework for the National System of MPAs as a guide for its activities. The program, in coordination with the Department of the Interior, fills a long-standing need for objective science, policy, and management tools to advance the effective use of MPAs in advancing diverse conservation and management objectives. The MPA Center's primary goal is to coordinate among the various Federal, state and tribal MPA programs to develop a comprehensive and integrated national system of MPAs, including NERRs and sanctuaries, that more effectively conserves and protects significant areas of our natural and cultural marine heritage. A diverse MPA Federal Advisory Committee-- including representatives of industry, user groups, scientists, and others-- provides advice on the establishment and management of the national system. NOS carries out its sanctuaries and estuarine reserve activities in close coordination with its MPA center activities.

Sentinel Sites

The NOAA Sentinel Site Program (SSP) uses existing capacity of range of NOAA programs to answer critical coastal management science questions using place-based approaches. While the concept of leveraging existing resources is not new, the NOAA Sentinel Site Program provides a framework to connect programs across disciplines and activities to inform decision-makers at relevant spatial and temporal scales. The Sentinel Site Program's initial focus is on assessing and responding to the impacts of climate change, specifically sea level change and coastal inundation. In the future, NOAA plans to expand the program's issue coverage to include other pressing issues that affect both NOAA trust resources and surrounding communities, such as ocean acidification.

Each of the current five Sentinel Site Cooperatives includes a coastal commerce center and at least one sanctuary or NERR. The Sentinel Site Program leverages these existing investments to maximize the benefit of the end-to-end spectrum of products and services— monitoring, research, modeling, spatial analysis, knowledge transfer, and resource management action. The presence of significant coastal commerce at the sites maximizes the potential economic return on improved management and planning practices.

Schedule and Milestones:

- Develop, distribute, update, and apply moderate resolution coastal land cover change analysis data (refreshed on five-year basis) for coastal regions (FY 2016- FY 2020)
- Enhance flood inundation impacts viewer by incorporating probabilistic seasonal outlooks and extremes, with an initial emphasis on the Pacific Islands, PR, and USVI (FY 2016 – 2020)
- Complete and publish a Federal Funding Opportunity for Regional Coastal Resilience Grants and award up to 12 cooperative agreements (FY 2016)
- Complete revision of 15 NERR management plans by FY 2016
- Complete 96 percent of National Estuarine Research Reserve site profiles by FY 2016
- Conduct monitoring of sea level change and habitat response at four reserves (FY 2016 – 2020)
- Execute 33 state coastal assessments and strategies under CZMA Sec. 309 to enhance coastal management in the U.S. states and territories, including innovative coastal resilience strategies competitively funded under Projects of Special Merit (FY 2016 – 2020)
- Continue to improve coral bleaching forecasts and ocean acidification models (FY 2016 – 2020)

- Complete the State of Coral Reef Ecosystems Report every four years and distribute to policy makers, resource managers and others to facilitate implementation of coral reef conservation strategies (FY 2016)
- Conduct social marketing campaigns to raise awareness of coral reef conservation and change behavior (FY 2016 – 2020)
- Implement additional sentinel monitoring activities where necessary to assess impacts of threats (e.g. climate change, biodiversity loss, invasive species) to ONMS resources and detect early warnings of change at national, regional, and local scales (FY 2016 – 2020)
- Update the Framework for the National System of Marine Protected Areas of the United States of America (FY 2016 – 2020)
- Implement data management (including access and distribution) protocols, infrastructure, and partnerships for ONMS Sentinel Monitoring Program (FY 2016 – 2019)
- Complete assessments on management effectiveness of 20 Marine Protected Areas (MPAs) in priority coral reef sites (FY 2017)

Deliverables:

- Data, mapping, tools, and information resources through Digital Coast to address competing uses of coastal resources, socio-economic data and adaptation to coastal hazards and climate change
- Two state or local adaptation plans annually to decrease community vulnerability
- An average of 2,000 acres of key coastal habitats protected by state coastal management programs through acquisition or easement per year
- More than 300 training activities conducted annually for coastal decision-makers through the NERRS Coastal Training Program
- 140 operational monitoring stations at NERR sites delivering water quality and weather data to a wide range of private and public users
- Expanded partnerships with local communities and businesses to implement sustainable practices for fishing, tourism, recreation, ecosystem protection and alternative energy technologies
- Forecasts and models that increase reef managers' monitoring and response efforts on coral bleaching events
- Seven reports – one per jurisdiction – on the status of jurisdictional management capacity (organizational, human resources, legal and technical) to determine the capacity gaps that need to be addressed in order for local resource management efforts to be effective
- Development and implementation of watershed management plans to reduce pollutant loadings in target watersheds adjacent to priority coral reef habitats
- Marine acoustics programs to determine the distribution of marine mammals and vessel traffic patterns at Stellwagen Bank and Channel Islands sanctuaries. Develop education initiatives at all sites that protect marine mammals from vessel strikes and conduct disentanglement and rescue operations
- Design and implementation of MPA networks, to enable effective conservation of more acres of coral reefs within U.S. boundaries
- New education, survey and eradication programs to avoid and mitigate introduction of invasive species in multiple sanctuaries
- Community-based management plan for HI/Humpback Whale NMS
- Tools and visualizations (3-4 annually) that allow coastal community decision-makers and the private sector to assess their risk from flood disasters

Performance Goals and Measurement Data:

Performance Measure: Percentage of U.S. coastal states and territories demonstrating 20 percent or more annual improvement in resilience capacity to weather and climate hazards (Measure 3.3g)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	54%	51%	60%	66%	71%	77%	77%
Description: This measure tracks a range of contributions to address coastal community risk, vulnerability, and resilience to coastal hazards. It quantifies NOAA's contributions to this important goal across NOAA's coastal programs, measuring how NOAA is improving the Nation's capacity for resilience to hazards and is contributing significantly to NOAA's efforts to improve integration of its coastal programs, and expanding beyond the three coastal integration programs providing inputs to the measure (OCM and Sea Grant).							

Performance Measure: Percentage of tools, technologies, and information services that are used by NOAA partners/ customers to improve ecosystem-based management (Measure 3.3e)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	100%	87%	91%	91%	91%	91%	91%
Description: This measure tracks NOAA's success in providing tools, technologies, and information services that enable progress toward the principles of ecosystem-based management (considering ecological, economic, social, and security concerns) for coastal, marine, and Great Lakes ecosystems. NOAA partners and customers include Federal, state, local and tribal authorities who make decisions affecting resources in the U.S. coastal zone, and other users affecting the condition of coastal ecosystems (e.g., private industry). NOAA calculates actual performance by dividing the number of tools/services developed by the end of the year by the number proposed at the beginning of the year.							

Performance Measure: Annual number of new or improved public access sites through CZMP	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	200	250	250	250	250	250	250
Description: This measure tracks the number of sites that have been created or enhanced for public recreational access to the coast (under the Coastal Zone Management Program).							

Performance Measure: Number of priority sites with completed and approved watershed management plans	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	18	19	20	21	21	21	21
Description: This measure tracks the progress of NOAA's Coral Program to reduce land-based sources of pollution (LBSP) from priority site watersheds to coral reef areas that have been identified through the jurisdictional management priority setting process. Watershed management plans include to the greatest extent practicable, the nine (9) required elements of a WMP according to the EPA Section 319 program and include a ridge to reef approach to ensure coral reef ecosystems are integrated into watershed planning processes. Once plans are approved, projects are implemented to reduce LBSP to coral reef ecosystems.							

Performance Measure: Number of participants of focus area training activities	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	1,092	1,114	1,136	1,159	1,182	1,182	1,182
Description: This measure tracks the number of participants trained by the NOAA Office for Coastal Management on priority coastal issues (e.g., climate adaptation strategies, coastal inundation mapping) the application of geospatial technology (e.g., GIS), process skills (e.g., project design and evaluation), and tool-based trainings that explain how to apply certain customized decision support tools to coastal management (e.g., CanVis).							

Performance Measure: Number of NMS Sites that maintain or improve water quality, habitat and living marine resources	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	10	10	12	12	12	12	12
Description: This measure assesses the status of water quality, habitat, and/or living marine resources based on indicators of biodiversity, key species, extracted species, invasive species, health and human impacts. The NMSP and independent evaluators (universities, research institutions SAC research subcommittees, and environmental consultants) evaluate data to determine whether the condition is improving, remaining stable (maintaining), or deteriorating. For each sanctuary, a "condition report" integrates the best available science and scientific interpretation to quantify the status and trends of WQ, habitat and living resource conditions.							

Performance Measure: Number of coastal communities that completed projects to reduce future damage from or increase public awareness of hazards with assistance from CZM funding or staff (annual)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	70	70	75	85	95	105	115
Description: This measure tracks how support from NOAA programs is applied in state and local communities to achieve improvements in hazard awareness and/or preparedness. Not all projects can be completed within a single year; therefore, the number of communities does not steadily increase until FY 2017.							

Performance Measure: Number of communities that utilize Digital Coast (Measure 3.3a)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	4,750	5,375	5,500	5,500	5,500	5,500	5,500
Description: This measure, obtained via web statistics, provides a level of depth beyond traditional measures, such as number of visits or page views, which allows the effort to assess where its users are coming from. Given that the Digital Coast effort is national in scope, yet local in its approach to providing geospatial information to address coastal issues, such as coastal resilience, this measure provides valuable information that is used to direct outreach efforts and content development.							

PROGRAM CHANGES FOR FY 2016:

Coastal Zone Management and Services: Ecosystem-Based Solutions for Coastal Resilience (Base Funding: \$42,364,000 and 137 FTE; Program Change: +\$5,000,000 and 0 FTE):

NOAA requests an increase of \$5,000,000 and 0 FTE for a total of \$47,364,000 and 137 FTE for an integrated, cross-Line Office and cross-disciplinary initiative to better inform decision-making with respect to the stewardship and resilience of inshore ecosystems and the living resources and human communities that depend on them. This will be a cross-Line Office initiative with NOAA's National Marine Fisheries Service (NMFS) proposal "Ecosystem-based Solutions for Fisheries Management" (page NMFS-49). The NOS component of this proposal will apply resources in physical and social sciences to help coastal planners integrate ecosystem-based solutions into hazard mitigation, resilient coastal development, and post-disaster rebuilding.

Proposed Actions:

NOS and NMFS will collaboratively promote 1) protective coastal infrastructure in the face of inundation risk and inshore habitat loss and 2) sustainable and healthy populations of fish and protected species. Working through the NOAA Habitat Conservation Team, NMFS and NOS will cooperatively select a region or regions to implement this ecosystem science effort. Within the selected region(s) NOAA will develop projects in partnership with local and regional scientists, resource managers, and community decision-makers. The projects will be composed of phased activities in the categories of foundational research and data collection; economic valuation; assessment, modeling and decision support tools; and, for NOS, training, communication, and planning. The integrated execution of these NMFS and NOS initiatives recognizes that coastal ecosystems serve the dual purposes of habitat for managed species and a physical defense for coastal communities (e.g. marshes, dunes, mangroves, etc.).

This proposal will support near-shore ecosystem science to strengthen the physical and economic resilience of coastal communities with respect to natural (or "green") infrastructure (natural rather than built systems) and fisheries habitat. Equipped with ecosystem valuation information and associated tools, coastal planners and fisheries managers will be able to conduct sound cost-benefit studies and other analyses that fully account for the tradeoffs of ecosystem protection versus other types of development and resource use.

The \$5,000,000 NOS component of this proposal will assist coastal communities with incorporating natural infrastructure into hazard mitigation, resilient coastal development, and post-disaster rebuilding decisions. NOS will evaluate the effectiveness of natural infrastructure and natural floodplains for protecting coastal property from long-term inundation threats (e.g. changes to sea level, tides, and wave erosion). The integrated execution of these NMFS and NOS initiatives recognizes that coastal ecosystems serve as both habitat for managed species and as a physical defense for coastal communities (e.g. marshes, dunes, mangroves, etc.), as well as providing benefits such as water quality, carbon sequestration, reduced habitat fragmentation, and recreation sites.

Using a place-based approach NOAA will work closely with local resource managers and stakeholders in selected areas to identify requirements for surveying, monitoring and technical assistance. NOS will work with NMFS to synthesize the best available ecological and socio-economic data to provide fisheries managers and coastal managers with a broader understanding of how ecosystem restoration, coastal development and planning considerations affect both fish stocks and community resilience. The two initiatives will develop shared study designs where applicable to maximize efficiency of assessment efforts. Shared assessment

data will improve understanding of ecosystem services and have the added benefit of providing baseline conditions for assessing damage to ecosystem services from future events such as coastal storms and oil spills.

NOS will train and advise coastal practitioners and decision makers on how to incorporate this information and apply adaptive management measures to long-term planning. Outreach efforts will include support for new and existing communities of practice (COP) to develop and share lessons-learned and successful approaches using natural infrastructure solutions among coastal partners and communities.

Statement of Need and Economic Benefits:

Approximately 163 million Americans live near the coast and 89 million people vacation on the coasts every year.⁶ According to a report released in March 2014 by the Census Bureau, the U.S. population in the counties directly along the coast experienced a 39 percent increase in population from 1970 to 2010. The population density at the coast is expected to continue increasing, further intensifying the pressures of development on ecologically and economically important areas and human exposure to the impacts of climate change, such as sea level rise and coastal storms. In order to increase resilience of valuable marine resources, communities, and coastal economies, coastal decision makers urgently need up-to-date information on the tradeoffs between ecosystem services and other uses of coastal lands and waters.

NOAA is authorized by the Magnuson-Stevens Act, Endangered Species Act, Coastal Zone Management Act, Coral Reef Conservation Act and other laws to conserve, manage, and promote sound management of coastal and marine ecosystems and resources. Currently, NOAA possesses an incomplete understanding of the economic value and performance of these ecosystem services and their vulnerability to the cumulative effects of climate change and other stressors such as coastal development. Better fisheries management and more resilient communities require an understanding of the economic value provided by these habitats and the living resources they support, and the role the natural environment plays in coastal protection.

NOAA will improve understanding of these dynamics and translate the environmental intelligence to informed decisions on protecting and enhancing these critical ecosystem services. By improving understanding the value of coastal habitats' ecosystem services and their interconnections, NOAA partners can better prioritize conservation and restoration resources, define essential fish habitat (EFH) and critical habitat, and incorporate resilient natural infrastructure into development. Better informed decisions will yield more effective coastal resource management, hazard resilience strategies and disaster recovery efforts to the benefit of coastal communities and economies.

Resource Assessment:

The resources of several NOAA programs contribute to observations, data management; models and visualization tools, and development of adaptation strategies. Specific ecosystem valuation data are needed to realize the next levels of protection, preparedness and adaptation

⁶ NOAA's 2013 State of the Coast Report: National Coastal Population Report, <http://stateofthecoast.noaa.gov/features/coastal-population-report.pdf>; U.S. Commission on Ocean Policy: An Ocean Blueprint, 2004, http://jointoceancommission.org/documents/USCOP_report.pdf

to address both current and future risk. In FY 2015, NOAA's National Marine Fisheries Service is administering a \$5.0 million Coastal Ecosystem Resilience Grants program to support implementation of actions that build resilience of U.S. coastal and ocean ecosystems, and NOAA's National Ocean Service is administering \$5.0 million for a Regional Coastal Resilience Grants program to support implementation of actions that directly build resilience of U.S. coastal communities. This proposal will complement and inform regional and community-based activities funded via these two grant programs as well as other investments in coastal infrastructure and ecosystems, both Federal and non-Federal.

Schedule and Milestones:

- Expand baseline environmental data (Sentinel stations (i.e. SETS, wetland vegetation assessments, water level monitoring) and assessment of shoreline conditions and land use patterns (FY 2016 – 2020)
- Develop market and non-market ecosystem value information in coordination with NFMS to support and guide investments in landscape scale restoration, conservation of wetlands and other ecosystems for resilience and other fisheries management outcomes (FY 2016 – 2020)
- Apply environmental and economic data to more rapidly and accurately assess damages to natural resources and better quantify the benefits of natural infrastructure (FY 2017 – 2020)
- Develop online training modules to deliver specialized knowledge for response and recovery actions that improve capacity for scientific support for disaster management and capacity to conduct rapid natural resource damage assessments (FY 2016 – 2017)
- Develop enhanced hazard visualizations and predictive tools (FY 2017 – 2020)
- Support training and place-based, pre-disaster preparedness and disaster mitigation planning, response, and recovery operations (FY 2018 – 2020)

Deliverables:

- Socio-economic assessments integrated with ecosystem services valuations to support coastal communities and fisheries resources to identify benefits and tradeoffs when implementing natural infrastructure solutions (2-3 annually)
- Tools and visualizations that support coastal community decision makers (1 annually)
- Support for existing or new "Communities of Practice" to expand application of products and exchange knowledge and lessons learned (1-2 annually)
- Expanded environmental baselines and ecological predictive tools to support ecosystem valuation, more timely and accurate damage assessments (2 stations or tools annually)
- Risk communication and/or social marketing strategies to support ecosystem based solutions to mitigate storm surge and flooding (1-2 annually)
- Technical assistance and trainings (2-3 annually)
- Response, mitigation and adaptation plans; strategies and policies developed within coastal states and communities (1-2 annually)

Performance Goals and Measurement Data:

Performance Measure: Number of communities that utilize Digital Coast (Measure 3.3a)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	5,500	5,750	5,750	5,875	5,875
Without Increase	4,750	5,375	5,500	5,500	5,500	5,500	5,500
Description: This measure tracks the number of coastal communities that visit the Digital Coast website to obtain coastal information resources. “Coastal communities” are defined as census-designated places (CDPs includes cities, towns, villages, townships) within each coastal state. This measure is used in concert with the number of total web visits and the number of data and tools downloaded to determine outreach effectiveness and web content changes in providing data, tools, training, and related information resources to coastal communities.							

Performance Measure: Percentage of U.S. coastal states and territories demonstrating 20 percent or more annual improvement in resilience capacity to weather and climate hazards (Measure 3.3g)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	60%	69%	74%	80%	80%
Without Increase	54%	51%	60%	66%	71%	77%	77%
Description: This measure tracks a range of contributions to address coastal community risk, vulnerability, and resilience to coastal hazards. It quantifies NOAA’s contributions to this important goal across NOAA’s coastal programs, measuring how NOAA is improving the Nation’s capacity for resilience to hazards and is contributing significantly to NOAA’s efforts to improve integration of its coastal programs, and expanding beyond the two coastal integration programs providing inputs to the measure (OCM and Sea Grant).							

Performance Measure: Virtual training modules developed for decision-makers and responders to support disaster response planning and preparedness.	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	1	2	2	2	2
Without Increase	1	1	1	1	1	1	1
Description: NOAA/OR&R presently offers in-person training for responders on topics including the Science of Oil Spills, Aerial Observer Training, and the Shoreline Cleanup and Assessment Technique (SCAT), but these opportunities are volume-limited by staff availability and class size and cannot meet demand. Making these training modules available virtually would provide first responders and other stakeholders in geographically dispersed (including tribal, territorial and rural) communities, as well as new response staff who may be unable to travel, access to these valuable trainings that enhance safety and effective scientific support for all-hazards incidents.							

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: National Ocean Service
Sub-program: Ocean and Coastal Management and Services
Program Change: Ecosystem-based Solutions to Support Coastal Community Resilience

Object Class	FY 2016 Increase	FY 2016 Total Program
11 Personnel compensation		
11.1 Full-time permanent	\$0	\$8,828
11.3 Other than full-time permanent	0	291
11.5 Other personnel compensation	0	0
11.8 Special personnel services payments	0	0
11.9 Total personnel compensation	<u>0</u>	<u>9,119</u>
12 Civilian personnel benefits	0	2,795
13 Benefits for former personnel	0	0
21 Travel and transportation of persons	0	575
22 Transportation of things	0	12
23.1 Rental payments to GSA	0	675
23.2 Rental Payments to others	0	7
23.3 Communications, utilities and miscellaneous charges	0	443
24 Printing and reproduction	0	17
25.1 Advisory and assistance services	3,000	3,956
25.2 Other services	0	577
25.3 Purchases of goods & services from Gov't accounts	0	7,814
25.4 Operation and maintenance of facilities	0	0
25.5 Research and development contracts	0	75
25.6 Medical care	0	0
25.7 Operation and maintenance of equipment	0	0
25.8 Subsistence and support of persons	0	0
26 Supplies and materials	0	295
31 Equipment	0	698
32 Lands and structures	0	0
33 Investments and loans	0	0
41 Grants, subsidies and contributions	2,000	20,306
42 Insurance claims and indemnities	0	0
43 Interest and dividends	0	0
44 Refunds	0	0
99 Total obligations	<u>\$ 5,000</u>	<u>\$47,364</u>

Coastal Zone Management and Services: Capacity to Respond to Extreme Events (Base Funding: \$42,364,000 and 137 FTE; Program Change: \$4,780,000 and 0 FTE): NOAA

requests an increase of \$4,780,000 and 0 FTE for a total of \$47,144,000 and 137 FTE to build NOAA's internal capacity to provide products and services that help communities respond to and recover from extreme events. These include, but are not limited to, continued improvements to inundation monitoring and modeling, social science and risk communication, tools and decision support, place-based monitoring, and training on risk communication strategies.

Proposed Action:

NOAA requests an increase of \$4,780,000 to expand products and services that help coastal communities prepare for, respond to, and recover from natural disasters. These initiatives will build on recovery efforts and lessons learned from recent extreme weather events.

- An enhanced network of expanded real-time inundation observations will provide accurate and timely information
- Improved inundation modeling will improve storm surge forecasts and long-term detection of sea level impacts
- Targeted technical assistance and risk communication strategies based on sound social science will interpret the information for planning and management decisions.
- Strengthening connections among NOAA capabilities (for example, the NOAA Sentinel Sites program), monitoring sites (for example, tide stations and NERRS Sentinel Stations), and decision makers will improve management activities

NOAA will deliver actionable information and technical assistance to help states and local communities to leverage existing data and tools for coastal planning and development decisions. Many existing products for marine navigation, if combined with value added services, could inform protection of land-based coastal resources for inundation. For example, coastal communities have requested tools that describe inundation risk in terms of physical markers on land (i.e. predicted water level as a distance above a specific location on land) rather than a tidal datum (e.g. mean high water level).

Translating NOAA water level data, elevation data and storm surge forecasts into forms that are more readily useful to coastal communities will improve their preparedness for and response to disaster events including the protection of inland infrastructure, post-disaster recovery, and adaptation to changing ocean conditions. NOAA will maximize the benefits of this information using improved methods of communicating risk that effectively induce sound management actions.

Statement of Need and Economic Benefits:

America's coastal communities and shorelines are facing escalating risks from changes in storm intensity, precipitation, flooding, and sea level change that can result in dramatic economic losses. Inundation from extreme weather events, exacerbated by sea level rise, is an acute and increasingly frequent risk to the coasts. NOAA's National Climatic Data Center recorded 14 weather and climate-related disasters with over \$1.0 billion in damages each in 2011. In 2012, AON Benfield (an insurance broker) recorded 11 disasters with over \$1.0 billion in damages. Coastal areas also account for the most repetitive flood loss claims with the National Flood Insurance Program (NFIP) and the private casualty loss insurance industry, at a cost of \$200.0 million per year for the NFIP alone. Furthermore, a recent Heinz

Center study reported that insurance claims generally account for only half of the total losses associated with any disaster event.

According to the Census Bureau, the U.S. population in the counties directly along the coast experienced a 39 percent increase in population from 1970 to 2010. The population density at the coast is expected to continue increasing into the future, further intensifying the pressures on ecologically and economically important areas, and putting more people, infrastructure, and businesses/ economic drivers in the path of coastal storms. Potential economic impacts are significant in this region, as coastal economies contributed \$8.3 trillion to the GDP in 2010 (58 percent).

Resource Assessment:

A majority of the current social science support for NOAA is supplemented through limited, yet productive, grants and contracts with academia and private industry. This request allows NOAA to incorporate social science expertise into the life cycle of product development, providing more targeted messaging, delivery mechanisms, training, and evaluation to NOAA customers.

Observations, data management and analysis; the development and application of models and visualization tools; appropriate education and outreach; and the inclusion of adaptation strategies for the management of NOAA trust resources are all being conducted within the current resources of many NOAA programs. In addition, NOAA's supplemental funding resulting from Hurricane Sandy is already supporting technical assistance activities in Sandy-affected communities. The support outlined in this proposal would build upon these efforts, transferring lessons-learned to other regions working to improve their resilience before the next extreme event.

Schedule and Milestones:

FY 2016:

- Extend water level benchmarks networks to provide inundation information at locally- significant landmarks to improve communication of risk and facilitate clear warnings
- Improve accuracy of total water level inundation predictions for all vulnerable U.S. coastal regions by transitioning to operations community-based models evaluated in a test bed framework which provides a high resolution ensemble of coupled surge/tide/wave/river modeling systems
- Align and simplify communication of NOAA's real-time products, observations, forecasts, and seasonal outlooks by improving mechanisms to promote situational awareness and referencing terms readily understood by emergency managers and the public (e.g. "above ground level")
- Collect non-Federal IOOS models and data sets to support ensemble approaches and Next Generation Storm Surge Modeling and evaluation via the U.S. IOOS Coastal and Ocean Modeling Testbed (COMT)
- Continue developing capacity to model wave run-up to provide better forecasts for impacts to beaches, based on a pilot project with NWS Eastern Region and USGS (Marine Geology).
- Begin to develop pilot maps and tools that communicate future flood risk
- Enhance flood inundation impacts viewer by incorporating probabilistic seasonal outlooks and extremes, with an initial emphasis on the Pacific Islands, PR, and USVI

- Develop outreach and training materials (including virtual formats) based on the findings of recent social science research and assessments on effectively communicating storm surge and sea level rise risks so safer actions are taken
- Begin to develop training and place-based planning to improve disaster preparedness, response and recovery operations
- Develop a Sentinel Site Program national decision support framework that integrates cross- NOAA sea level rise resources and other climate resources

FY 2017-2020:

- Document evaluation results of modeling capabilities to ensure complementary non-Federal and Federal approaches and improved efficiency
- Continue to use social science research, methods, and tools to better understand how to communicate risk and improve the public's response to risks across multiple inundation products and time scales (storm surge forecasts, FEMA FIRMs, sea level change mapping)
- Improve visualizations and animations of inundation events and scenarios
- Support and enhance a network of place-based Sentinel Sites providing information that supports regional planning and decision-making linked to extreme events and climatic impacts
- Support improved local strategies and policies to address inundation

Deliverables:

- Protocols and practices for establishing benchmarks and water level stations for real-time inundation reporting (water level height above ground level) and integration into NERRS Sentinel Sites to address long term impacts
- Outreach and training materials for emergency managers to understand how to relate storm surge forecasting with real-time water level observation to more clearly communicate predicted water level and risk as a distance above a specific location on land
- Technical assistance and expertise for applying and expanding inundation products and risk communication messaging targeted to NOAA Sentinel Site Cooperatives
- Tools and visualizations (3-4 annually) that allow coastal community decision makers and the private sector to assess their risk from flood disasters
- Assessments of social and economic benefits of green infrastructure implementation in recovering/redeveloping communities
- Place based, coordinated, disaster response planning, in coordination with coastal states and communities, to support development of response protocols, mitigation/adaptation strategies, and identification of environmental stressors and potential environmental resources at risk
- OAA Sentinel Site Program national decision support framework. Virtual training modules to proliferate courses and curricula covering a wide variety of topics for emergency decision makers, including: science of oil spills, storm surge dynamics, marine debris monitoring, risk assessment and removal best practices, risk communications, shoreline assessment, environmental trade-offs, Natural Resource Damage Assessment, response to oiled wildlife, and others

Performance Goals and Measurement Data:

Performance Measure: Virtual training modules developed for decision-makers and responders to support disaster response planning and preparedness	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	1	2	2	2	2
Without Increase	1	1	1	1	1	1	1
Description: NOAA/OR&R presently offers in-person training for responders on topics including the Science of Oil Spills, Aerial Observer Training, and the Shoreline Cleanup and Assessment Technique (SCAT), but these opportunities are volume-limited by staff availability and class size and cannot meet demand. Making these training modules available virtually would provide first responders and other stakeholders in geographically dispersed (including tribal and rural) communities, as well as new response staff who may be unable to travel, access to these valuable trainings that enhance safety and effective scientific support for all-							

Performance Measure: Number of communities that utilize Digital Coast (Measure 3.3a)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	5,375	5,375	5,750	5,875	5,875
Without Increase	4,750	5,250	5,375	5,500	5,500	5,500	5,500
Description: This measure tracks the number of coastal communities that visit the Digital Coast website to obtain coastal information resources. "Coastal communities" are defined as census-designated places (CDPs - includes cities, towns, villages, townships) within each coastal state. This measure is used in concert with the number of total web visits and the number of data and tools downloaded to determine the effectiveness of outreach efforts and web content changes in providing data, tools, training, and related information resources to coastal communities.							

Performance Measure: Percentage of U.S. coastal states and territories demonstrating 20 percent or more annual improvement in resilience capacity to weather and climate hazards (Measure 3.3g)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	60%	69%	74%	80%	80%
Without Increase	54%	51%	60%	66%	71%	77%	77%
Description: This measure tracks a range of contributions to address coastal community risk, vulnerability, and resilience to coastal hazards. It quantifies NOAA's contributions to this important goal across NOAA's coastal programs, measuring how NOAA is improving the Nation's capacity for resilience to hazards and is contributing significantly to NOAA's efforts to improve integration of its coastal programs, and expanding beyond the two coastal integration programs providing inputs to the measure (OCM and Sea Grant).							

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Program: National Ocean Service
Sub-program: Ocean and Coastal Management and Services
Program Change: Capacity to Respond to Extreme Events

Object Class		FY 2016 Increase	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$8,828
11.3	Other than full-time permanent	0	291
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	0	9,119
12	Civilian personnel benefits	0	2,795
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	575
22	Transportation of things	0	12
23.1	Rental payments to GSA	0	675
23.2	Rental Payments to others	0	7
23.3	Communications, utilities and miscellaneous charges	0	443
24	Printing and reproduction	0	17
25.1	Advisory and assistance services	3,500	4,456
25.2	Other services	0	577
25.3	Purchases of goods & services from Govt accounts	0	7,814
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	75
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	295
31	Equipment	0	698
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	1,280	19,586
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	\$ 4,780	\$47,144

Coastal Zone Management and Services: AmeriCorps' Resilience Corps Pilot Program Training and Technical Assistance (Base Funding: \$42,364,000 and 137 FTE; Program Change: \$2,000,000 and 0 FTE): NOAA requests an increase of \$2,000,000 and 0 FTE for a total of \$44,364,000 and 137 FTE for a community resilience training and technical assistance program for the AmeriCorps' Resilience Corps Pilot Program

Proposed Actions:

The new Resilience Corps Pilot Program of the Corporation for National and Community Service will help communities advance their climate resilience goals. With this budget increase, NOAA will train Resilience Corps AmeriCorps members to provide effective technical assistance, guidance, and on-the-ground support to communities where they will be working. Resources for these Resilience Corps members' deployment and support are being requested separately by the Corporation for National and Community Service in FY 2016.

NOAA will develop the training curricula in partnership with the Corporation for National and Community Service and other Federal agencies (e.g., EPA, DOI, USDA, FEMA) and organizations engaged in resilience planning. The training will leverage available technical assistance resources, including Federal tools and resources that communities can use to identify climate-related risks and develop community resilience plans. NOAA will tailor additional technical assistance as needed for the members working in coastal communities. NOAA will deliver the training and ongoing technical assistance support through a network of trainers and technical assistance resource specialists that builds on existing partnerships (National Sea Grant Program extension, National Estuarine Research Reserves Coastal Training Program and Education Coordinators, other Federal agencies, local museums and aquaria, etc.).

This training program will provide a community-focused component that complements other resilience increases in the FY 2016 President's request that address decision support needs and regional project implementation (Regional Coastal Resilience Grants, Ecosystem Based Solutions for Resilience, and Capacity to Respond to Extreme Events).

Statement of Need and Economic Benefits:

America's coastal communities and shorelines are facing escalating risks from changes in storm intensity, precipitation, flooding, and changing sea levels that can result in dramatic economic losses. Increasing population density along the coast is not only putting more people in the path of coastal storms, but also is intensifying pressure on ecologically and economically important areas. A 2011 report by the New York State Energy Research and Development Authority warned that the combination of sea level rise and coastal surge that can accompany a powerful storm could flood much of New York City's major infrastructure, and estimated that the economic losses from a 100-year storm could range from \$58 billion to \$84 billion.⁷ The estimated \$65 billion in damages⁸ from Superstorm Sandy, which overwhelmed the city in October 2012, falls directly within that range. NOAA's National Climatic Data Center recorded 14 weather and climate-related disasters in 2011 with over \$1 billion in damages each, the highest number on record for a single year. The economic disruptions extend beyond the path of the extreme event to economic sectors that rely on coastal industries.

⁷ <http://www.c2es.org/publications/weathering-storm-building-business-resilience-climate-change#endnote1>

⁸ <http://www.c2es.org/publications/weathering-storm-building-business-resilience-climate-change#endnote2>

Investing in community resilience will reduce the economic impacts of these hazards and improve national economic security. A 2005 study by the National Institute of Building Sciences on Federal hazard mitigation grants estimated that \$1 spent on hazard mitigation potentially leads to avoidance of \$4 in disaster relief costs and lost Federal tax revenue. Likewise, strengthening natural infrastructure will increase the resilience of communities and ecosystems and protect our valuable coastal economies and resources.

Most decisions to increase resilience are made at the state and local levels (e.g., coastal development, infrastructure and critical facilities siting, ecosystem restoration, etc.). Therefore, partnerships and decision support are essential to any Federal effort to effect improvements in resilience. The Corporation for National and Community Service's programs are well positioned to disseminate the necessary resilience and preparedness expertise to local communities. The Resilience Corps Pilot program will use approaches that have demonstrated success through programs such as FEMA Corps, Civic Spark, and Citizen Corps.

Resource Assessment:

This proposal would leverage existing NOAA training and technical assistance programs. NOAA has resource investments in resilience training development and delivery through the Office for Coastal Management (including the National Estuarine Research Reserves Coastal Training and Education Programs) and the National Sea Grant Program. These existing activities and networks offer established mechanisms for curriculum development and delivery for coastal decision-maker audience. The Office for Coastal Management also supports the Digital Coast Partnership, which provides opportunity to leverage connections to a range of organizations working in the coastal United States including the American Planning Association, Association of State Floodplain Managers, Coastal States Organization, and the National Estuarine Research Reserve Association. This increase would also leverage information and technical assistance provided by the National Climate Data Center's Regional Climate Service Directors and Regional Climate Centers and the Climate Program Office's Regional Integrated Sciences and Assessments (RISA) program.

In FY 2015, NOS is administering a Regional Coastal Resilience Grants (RCRG) program to support implementation of actions that directly build resilience of U.S. coastal communities. The RCRG program provides \$5.0 million to support regional implementation of resilience improvement projects. NOAA's National Marine Fisheries Service also is administering a \$5.0 million Coastal Ecosystem Resilience Grants program to build resilience of U.S. coastal and ocean ecosystems.

Schedule and Milestones:

- In cooperation with the Corporation for National and Community Service, identify gaps in community-based resilience that can be most effectively addressed by Resilience Corps members (FY 2016)
- In cooperation with the Corporation for National and Community Service, identify coastal geographies to focus on for initial implementation and associated training and technical assistance (FY 2016)
- Establish cooperative agreements with coastal training partners (e.g., Sea Grant, NERRS) to pilot test and provide training and technical assistance to Resilience Corps members and their sponsoring organizations in coastal communities (10-12 geographies) (FY 2016)
- Conduct needs assessments to assess gaps in available training and identify targeted training and technical assistance needs for Resilience Corps members in each geography (10-12) (FY 2017)

- Develop resilience training curricula (in person and on-line) and begin testing with resiliency training partners (FY 2016 – 2017)
- Provide training (e.g., workshops, webinars, ‘just in time’ online training) and technical assistance to Resilience Corps members and their sponsoring organizations (FY 2017 – 2020)
- Provide targeted information on resilience tools and information (e.g., Climate Resilience Toolkit) that can be used by Resilience Corps members to support resilience planning and implementation (FY 2017- 2020)

Deliverables:

- Network of climate resilience training and technical assistance support professionals
- ‘Community Resilience 101’ training curricula to ensure Resilience Corps members have a consistent baseline knowledge of climate adaptation planning, risk and vulnerability assessments and other approaches to support community resilience planning and implementation
- In-person and online training opportunities provided to Resilience Corps members

Performance Goals and Measurement Data:

Performance Measure: Number of Resilience Corps members trained (in-person and on-line) (cumulative)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	0	300	600	900	1200
Without Increase	0	0	0	0	0	0	0
Description: This measure tracks the number of Resilience Corps members who participate in trainings offered through NOAA’s network of training partners (e.g., NERRS CTP, Sea Grant, NOAA Education programs). Training will include process skills, climate content knowledge, how to use data and technical tools, and other topics as required. Volunteers may participate in more than one training event to accomplish desired level of proficiency and/or the scope of skills necessary for their assignments.							

Performance Measure: Percentage of U.S. coastal states and territories demonstrating 20 percent or more annual improvement in resilience capacity to weather and climate hazards (Measure 3.3g)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	60%	69%	74%	80%	80%
Without Increase	54%	51%	60%	66%	71%	77%	77%
Description: This measure tracks a range of contributions to address coastal community risk, vulnerability, and resilience to coastal hazards. It quantifies NOAA’s contributions to this important goal across NOAA’s coastal programs, measuring how NOAA is improving the Nation’s capacity for resilience to hazards and is contributing significantly to NOAA’s efforts to improve integration of its coastal programs, and expanding beyond the two coastal integration programs providing inputs to the measure (OCM and Sea Grant).							

Performance Measure: Number of Technical Assistance requests fulfilled to support Resilience Corps activities (Annual)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	0	25	50	60	70
Without Increase	0	0	0	0	0	0	0
Description: This measure tracks the number of successful deliveries of technical assistance for activities associated with Resilience Corps efforts. Technical assistance may include delivery of data, tools, and consultations on methods both in person and remotely. In some cases, assistance may be delivered in anticipation of an actual request.							

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Program: National Ocean Service
Sub-program: Ocean and Coastal Management and Services
Program Change: AmeriCorps' Resilience Corps Pilot Program Training and Technical Assistance

Object Class		FY 2016 Increase	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$8,828
11.3	Other than full-time permanent	0	291
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	0	9,119
12	Civilian personnel benefits	0	2,795
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	575
22	Transportation of things	0	12
23.1	Rental payments to GSA	0	675
23.2	Rental Payments to others	0	7
23.3	Communications, utilities and miscellaneous charges	0	443
24	Printing and reproduction	0	17
25.1	Advisory and assistance services	500	1,456
25.2	Other services	0	577
25.3	Purchases of goods & services from Gov't accounts	0	7,814
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	75
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	295
31	Equipment	0	698
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	1,500	19,806
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	\$ 2,000	\$44,364

Coastal Management Grants: Regional Coastal Resilience Grants (Base Funding: \$5,000,000 and 0 FTE; Program Change: +45,000,000 and 0 FTE): NOAA requests an increase of \$45,000,000 and 0 FTE for a total of \$50,000,000 and 0 FTE to expand the Regional Coastal Resilience Grants (RCRG) program. The objectives of this enhanced competitive grant program are twofold: 1) to increase the resilience of coastal communities and ecosystems by assisting with planning for and addressing extreme weather events, coastal inundation, climate hazards, changing ocean conditions, and competing uses; and 2) to support regional approaches that leverage existing resources and efforts and promote collaboration across jurisdictions and sectors.

Proposed Actions:

NOAA proposes to expand the scope and geographic reach of the RCRG program. Funding at \$50,000,000 will allow NOAA to more fully address a broad suite of resilience challenges facing all U.S. coastal regions—including community, ecosystem, and economic resilience.

With the increase, NOAA will expand the program scope to include projects that provide substantial protection, restoration, and enhancement of ecosystems and the services they provide and that improve communities' ability to plan for and address potential hazards. Healthy coastal and marine ecosystems provide an important contribution to the resilience of coastal communities and economies, including fishing economies, and will be a fully integrated component of the program. NOAA and the Federal Emergency Management Agency are currently developing a national resilience indicator framework to help communities understand their current resilience baseline and identify key information needs (e.g., ecological, social, geospatial) to guide implementation actions toward resilience targets. Over time and as development of the framework proceeds, this grants program will catalyze and incentivize its application.

The requested increase will allow coastal communities, with technical and financial support from NOAA and its partners, to more fully address the following:

- **Implement regional and community strategies that enhance preparedness, recovery, adaptation, and management.** Funds will support science-based approaches to building community resilience, including the restoration or enhancement of ecosystems. Natural and hybrid infrastructure solutions – such as living shorelines and coastal wetland restoration – can have profound impacts on the resilience of a region and its infrastructure during extreme events as well as on the productivity of its fisheries. Funds also will support activities that improve the resilience of economic activities that depend on coastal and marine ecosystems and waterways.
- **Improve creation of, access to, and use of integrated regional scale information to enable risk assessments and management decisions.** Funds will support regional efforts to improve access to and use of data regarding ecosystem services and the economies that depend on them. These data are needed to help decision makers within a region understand how ecosystem protection, coastal development, competing uses, and planning considerations affect their region's resilience. Such data acquisition and integration projects will complement the proposed improvements to NOAA's capabilities for ecosystem services valuation and risk assessment. While NOAA will focus on national-level data to enable valuation and risk assessment capabilities, these grants will provide finer-resolution, localized data to enable regional, state and local implementation of resilience actions. This part of the program will be jointly managed by NOS and NMFS.

- **Enhance technical capacity for adaptation and recovery.** Funds will help grantees build and sustain the technical capacity to implement adaptation strategies for environmental and socio-economic stressors (e.g., extreme events, sea level rise, ocean acidification, drought, competing uses), strengthen their ability to plan for and recover from extreme events, and establish resilience priorities and the ability to evaluate progress toward performance targets.

Many coastal regions and communities have completed hazard mitigation, land use, climate adaptation, and other regional action plans, but lack the resources to implement them. This increase will focus primarily on supporting existing efforts to expedite resilient outcomes. NOAA will work with the Department of the Interior to ensure this increase is complementary to their Coastal Resilience Fund, which will emphasize resilience efforts with a nexus to Federal lands.

Eligible funding applicants are state, territorial, tribal, and county/local governments nonprofit and private entities, institutions of higher education, and, and regional organizations.

Statement of Need and Economic Benefits:

America's coastal communities and shorelines are facing escalating risks from changes in storm intensity, precipitation, flooding, changing sea levels, and changes in ocean ecology that can result in dramatic economic losses. Increasing population density along the coast will further intensify pressures on ecologically and economically important areas, and put more people in the path of coastal storms. Increasing sea level can further escalate the costs and risks of inundation events. NOAA's National Climatic Data Center recorded 14 U.S. weather and climate-related disasters in 2011 with over \$1 billion in damages each, the highest number on record for a single year. A 2011 report by the New York State Energy Research and Development Authority warned that the combination of sea level rise and coastal surge that can accompany a powerful storm could flood much of New York City's major infrastructure, and estimated that the economic losses from a 100-year storm could range from \$58 billion to \$84 billion. The estimated \$65 billion in damages from "Superstorm" Sandy, which overwhelmed the city in October 2012, falls directly within that range and the Federal government has invested almost \$10 billion in aid to individuals, and state, local and tribal governments as well as \$450 million in hazard mitigation grants. A 2005 study by the National Institute of Building Sciences on Federal hazard mitigation grants estimated that \$1 spent on hazard mitigation potentially leads to avoidance of \$4 in disaster relief costs and lost Federal tax revenue. Smartly investing in resilience will reduce the economic impacts of these hazards and improve national economic security.

Resilient coastal communities depend not only on well-designed physical infrastructure but also on maintaining the industries that rely on coastal ecosystems and ocean resources. In 2012, U.S. commercial fisheries landed 9.6 billion pounds of seafood valued at \$5.1 billion; the seafood industry supported 1.3 million jobs and added \$59 billion of value to the Nation's GDP; and saltwater anglers took 72 million fishing trips, contributed \$58 billion in sales impacts to the U.S. economy, and supported over 381,000 jobs. The loss of working waterfronts and functioning coastal ecosystems can impact multiple sectors of local economies. Commercial and recreational fishers, ports, harbors and other water-dependent businesses, as well as citizens seeking access to the water for recreational activities such as fishing, boating, swimming and sightseeing are losing access to these freshwater and marine resources.

Strengthening natural infrastructure and habitat condition will increase the resilience of communities and ecosystems and protect our valuable coastal economies and resources. Most decisions that affect resilience are made at the state and local levels (e.g., coastal development,

infrastructure and critical facilities siting, ecosystem restoration, etc.). Therefore, NOAA's primary mechanism for advancing resilience is promoting sound decision-making through grants, information and technical assistance. Since many coastal hazard risks are common across a region, a regional approach to resilience will enable more effective implementation of best practices and successful solutions.

Resource Assessment:

In FY 2015, NOAA is providing \$5.0 million through Regional Coastal Resilience Grants program to support implementation of actions that directly improve resilience of U.S. coastal communities. The grants are supporting regional approaches to planning for, absorbing impacts of, recovering from, and/or adapting to adverse events and changing environmental, economic, and social conditions. NOAA's National Marine Fisheries Service is administering a \$5.0 million Coastal Ecosystem Resilience Grants program to implement projects that improve or restore coastal habitat, such as establishing living shorelines and restoring hydrologic connections to strengthen resilience of our coastal ecosystems.

NOAA and FEMA are co-leading an activity under the Insurance Roundtable within the President's Climate Action Plan to develop consistent national-level resilience indicators. In FY 2015, NOAA initiated a literature search to synthesize existing research and approaches for resilience indicators that can inform development of this framework. In FY 2015 and FY 2016, the national indicators framework will be completed and shared with regions around the country. NOAA can then use the grant program to incentivize communities to use the resilience indicators to self-assess their baseline, measure progress over time, and know the costs, benefits, and tradeoffs of how their investments will meet clear targets for improved resilience.

The Department of Commerce is in the process of developing a cross-bureau Resilience Strategy to enhance collaboration and ensure maximum impact of related DOC efforts. The requested increase builds upon emerging connections and information resources available through collaboration with: a) the U.S. Census Bureau to facilitate the use and application of socioeconomic data holdings in community-directed vulnerability assessments; b) the National Institute of Standards and Technology (NIST) to apply their Disaster Resilience Framework to coastal communities; and c) the Economic Development Administration to leverage opportunities for communities to most effectively use funding (including disaster recovery funds) to achieve their economic and resilience goals. Close coordination with key interagency efforts including the Department of Energy's Climate Action Champions program, the Department of Interior's Coastal Resilience Fund, and the Department of Housing and Urban Development's (HUD's) National Disaster Resilience Competition will help to minimize overlap while assisting grant recipients with access to information and technical resources.

The RCRG program focuses on leveraging existing partnerships to support implementation. Several national organizations participating in NOAA's Digital Coast have a strong focus on coastal resilience and economic security that may be leveraged to assist with execution of the program. By leveraging these efforts, NOAA will more effectively build the capacity of communities to support and implement resilience strategies, as well as broaden the understanding and engagement of citizens and volunteer organizations.

Schedule and Milestones:

- Work with the Department of the Interior, HUD, and FEMA to design a Federal Funding Opportunity (FFO) that is complementary to the DOI Coastal Resilience Fund, the HUD National Disaster Resilience Competition, the DOE Climate Champions initiative, etc., and field-based assistance programs and minimize overlap or conflicts (FY2016)
- Complete and publish Regional Coastal Resilience Grants FFO (FY 2016)
- Award up to 100 cooperative agreements (FY 2016)
- Work with DOC to strengthen connections with resilience activities in Census, NIST, EDA, and provide awardees with the most up-to-date data and resources to advance resilience objectives (FY2016 – 2020)
- Ensure effective connections with and to interagency planning, guidance, resources, and points of contact associated with Presidential Policy Directive-8 for National Preparedness (FY 2016 – 2020)
- Provide technical assistance to ensure that awardees fully leverage existing data and decision support tools to support their resilience objectives (FY 2015 – 2020)

Deliverables:

- Published Regional Coastal Resilience Grants FFO
- Up to 100 cooperative agreement awards to address coastal resilience objectives (FY2016)
- Technical assistance to awardees and sharing of lessons learned (2016)
- 2,000 acres of habitat restored/30 stream miles made accessible annually per \$5 million investment in ecosystem resilience grants

Performance Goals and Measurement Data:

Performance Measure: Percentage of U.S. coastal states and territories demonstrating 20 percent or more annual improvement in resilience capacity to weather and climate hazards (Measure 3.3g)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	60%	69%	74%	80%	80%
Without Increase	54%	51%	60%	66%	71%	77%	77%

Description: This measure tracks a range of contributions to address coastal community risk, vulnerability, and resilience to coastal hazards. It quantifies NOAA's contributions to this important goal across NOAA's coastal programs, measuring how NOAA is improving the Nation's capacity for resilience to hazards and is contributing significantly to NOAA's efforts to improve integration of its coastal programs, and expanding beyond the two coastal integration programs providing inputs to the measure (OCM and Sea Grant).

Performance Measure: Number of coastal communities that complete projects to reduce future damage from or increase public awareness of hazards with assistance from OCM funding or staff (annual)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	75	125	140	140	140
Without Increase	70	70	70	70	70	70	70

Description: This measure tracks how support from NOAA programs is applied in state and local communities to achieve improvements in hazard awareness and/or preparedness. While the increased funding will begin in FY 2016, the timeline of the competition and grants cycle is such that successful applicants will not receive funds until summer 2016 so that projects funded in FY 2016 will not likely begin until FY 2017. Targets are based on the assumption that projects will be funded at the \$500K-\$1M level. Not all projects will be completed within a single year, however, which is why the number of communities does not achieve their full increase until FY 2018.

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Program: National Ocean Service
Sub-program: Ocean and Coastal Management and Services
Program Change: Regional Coastal Resilience Grants

Object Class		FY 2016 Increase	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$0
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	<hr/> 0	<hr/> 0
12	Civilian personnel benefits	0	0
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	0
22	Transportation of things	0	0
23.1	Rental payments to GSA	0	0
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and miscellaneous charges	0	0
24	Printing and reproduction	0	0
25.1	Advisory and assistance services	690	690
25.2	Other services	0	0
25.3	Purchases of goods & services from Gov't accounts	0	0
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	0
31	Equipment	0	0
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	44,310	115,456
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	<hr/> \$ 45,000	<hr/> \$116,146

* Due to financial system limitations, the object class detail for the program reflects the full Coastal Science, Assessment, Response and Restoration PPA

Sanctuaries and Marine Protected Areas: Sanctuaries Operations (Base Funding: \$49,661,000 and 186 FTE; Program Change: -\$1,361,000 and 0 FTE): NOAA requests a decrease of \$1,361,000 and 0 FTE for a total of \$48,300,000 and 186 FTE for the Sanctuaries and Marine Protected Areas Program. Operational reductions will be realized in scalable activities such as vessel operations. At this funding level, NOAA will support the highest priorities of all its authorizations, maintain its unique capabilities, support continued implementation of management plans across the National Marine Sanctuary System, and continue engaging coastal communities and stakeholders to promote science-based stewardship of designated areas.

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Program: National Ocean Service
Sub-program: Ocean and Coastal Management and Services
Program Change: Sanctuaries Operations

Object Class	FY 2016 Decrease	FY 2016 Total Program
11 Personnel compensation		
11.1 Full-time permanent	\$0	\$19,658
11.3 Other than full-time permanent	0	362
11.5 Other personnel compensation	0	0
11.8 Special personnel services payments	0	0
11.9 Total personnel compensation	<u>0</u>	<u>20,020</u>
12 Civilian personnel benefits	0	6,254
13 Benefits for former personnel	0	
21 Travel and transportation of persons	0	925
22 Transportation of things	0	221
23.1 Rental payments to GSA	0	1,428
23.2 Rental Payments to others	0	1,180
23.3 Communications, utilities and miscellaneous charges	0	895
24 Printing and reproduction	0	76
25.1 Advisory and assistance services	(961)	2,876
25.2 Other services	(100)	1,965
25.3 Purchases of goods & services from Govt accounts	0	4,169
25.4 Operation and maintenance of facilities	0	0
25.5 Research and development contracts	0	5
25.6 Medical care	0	0
25.7 Operation and maintenance of equipment	0	0
25.8 Subsistence and support of persons	0	0
26 Supplies and materials	(200)	1,133
31 Equipment	0	209
32 Lands and structures	0	0
33 Investments and loans	0	0
41 Grants, subsidies and contributions	(100)	6,943
42 Insurance claims and indemnities	0	0
43 Interest and dividends	0	1
44 Refunds	0	0
99 Total obligations	<u>\$ (1,361)</u>	<u>\$48,300</u>

Sanctuaries and Marine Protected Areas: Dr. Nancy Foster Scholarship Program (Base Funding: \$49,661,000 and 186 FTE; Program Change: \$0 and 0 FTE): NOS requests a decrease of \$0 and 0 FTE to terminate the Dr. Nancy Foster Scholarship Program at NOAA which is part of the Administration's reorganization of STEM education.

Proposed Actions:

As part of the Administration's comprehensive reorganization of STEM education programs to increase the impact of Federal investments, NOAA proposes to terminate the Dr. Nancy Foster Scholarship Program. NOAA currently provides awards through this Program to graduate students in oceanography, marine biology or maritime archeology. Funding for the Dr. Nancy Foster Scholarship Program is determined as one percent of Marine Sanctuaries funding in ORF and PAC according to the National Marine Sanctuaries Amendments Act of 2000 (Pub. L. 106-513). This funding will remain in the Sanctuaries and Marine Protected Areas and Marine Sanctuaries Construction Base PPAs.

In 2014, the President's Budget proposed a government-wide STEM reorganization to create a coherent framework for delivering STEM education to more students and more teachers more effectively while reducing fragmentation, and the Administration published a Five-Year Federal Strategic Plan on STEM Education to help align the reorganization with key goals and strategies. The areas of priority for this plan include improving pre-kindergarten-through-grade-twelve (pre-K-12) instruction; increasing and sustaining youth and public engagement with STEM; enhancing undergraduate STEM education; creating a national strategy around graduate fellowships; and better serving groups historically underrepresented in STEM.

Over the past two years, agencies have made considerable progress towards a stronger and more cohesive infrastructure for delivering STEM education. For example, in implementing the Strategic Plan, mission agencies have increased coordination with the lead agencies (the Department of Education, the National Science Foundation, and the Smithsonian Institution) and are identifying ways to leverage existing resources to improve the reach of agency assets.

The 2016 Budget builds on these efforts by proposing a fresh reorganization with targeted adjustments to enable more strategic investment in STEM education with a focus on building and using evidence-based practices and finding new models for leveraging assets and expertise.

**APPROPRIATION ACCOUNT: PROCUREMENT, ACQUISITION, AND CONSTRUCTION
SUB-PROGRAM: NATIONAL OCEAN SERVICE CONSTRUCTION**

The NOS Procurement, Acquisition, and Construction account includes two program activities funded within the NOS Construction sub-program.

National Estuarine Research Reserve System Construction

The National Estuarine Research Reserve System (NERRS) is a Federal-state partnership established under the CZMA designed to protect and understand valuable estuarine resources through research and education. For PAC, NERRS funding is matched 70:30 (Federal: state) for facilities construction and 1:1 for land acquisition. Reserves are publicly owned lands and onsite facilities that provide opportunities for researchers as well as the public to better understand these estuarine areas. Supplementing or updating facilities at the 28 reserves is carried on in conjunction with the development of system-wide construction plans. All construction activities are based on current needs for implementing core NERRS programs and external opportunities for partnerships. When land buying opportunities are available, reserves acquire additional nearby critical habitat within, or adjacent to, a reserve boundary as identified in reserve management plans to increase protection and provide places for conducting long-term science, education, and demonstration programs. The facilities and land of the reserves are owned and managed by the states. NERRS construction and land acquisition projects are selected on a competitive basis.

Out-year Funding Estimates (\$ in Thousands):

NERRS Construction and Land Acquisition	FY 2015 & Prior	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	CTC	Total
Change from FY 2016 Base								
Total Request	98,118	1,700	1,700	1,700	1,700	1,700	N/A	Recurring

National Marine Sanctuary Program Construction

NOAA administers the National Marine Sanctuary System under authority of the National Marine Sanctuaries Act. The Office of National Marine Sanctuaries manages and operates the Nation’s system of 13 Marine Sanctuaries and the Papahānaumokuākea Marine National Monument. The program has developed a comprehensive facilities plan that prioritizes needs and opportunities at individual sites for constructing exhibits, collaborative education and visibility projects, and operational needs. In order to establish better understanding and appreciation for sanctuary and other ocean resources by the public, the program constructed a network of exhibits, signage, and kiosks. Whenever possible, sanctuaries utilize existing aquaria, museums and other appropriate facilities to develop cooperative centers where the public and environmental decision-makers can gain direct, objective and focused information on conservation issues. These facilities serve as important windows into the resources of the Sanctuaries and act as a storefront for public interaction with NOAA programs. The goal of these exhibits is to share with the public these ocean treasures. In addition to these efforts, PAC funding supported operational facility requirements for NOAA-owned facilities, including safety improvements, ADA (Americans with Disabilities Act) upgrades, and replacement and repair.

Out-year Funding Estimates (\$ in Thousands):

National Marine Sanctuaries Construction	FY 2015 & Prior	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	CTC	Total
Change from FY 2016 Base								
Total Request	108,365	2,000	2,000	2,000	2,000	2,000	N/A	Recurring

Schedule and Milestones:

- Conduct national competitions for NERRS Acquisition/Construction to select projects for funding and report acres protected through the programs (FY 2016 – 2020)
- Conduct critical capital construction activities on Sanctuaries facilities and vessels, construction of exhibits, signage, and kiosks, and funding for limited emergency and required major small boat repairs (FY 2016 – 2020)

Deliverables:

- Financial assistance awards to state or local governments for competitively-selected projects
- Completion of ongoing projects at one of three sites: Crissy Field in San Francisco, CA, Gulf of Farallones National Marine Sanctuary (GFNMS), Galveston, TX, Flower Gardens Banks National Marine Sanctuary (FGBNMS), or Scituate, MA, Stellwagen Bank National Marine Sanctuary (SBNMS)
- Construction of exhibits, signage, and kiosks

Performance Goals and Measurement Data:

Performance Measure:	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
Annual number of NERRS facility construction projects that improve safety or environmental sustainability	Actual	Target	Target	Target	Target	Target	Target
	7	7	7	7	7	7	7

Description: NERRS PAC funding is awarded for construction projects based on a competitive process. Projects must be consistent with approved reserve management plans. Projects are prioritized by those that address safety or inadequate facilities and projects that improve environmental sustainability or public use/access.

PROGRAM CHANGES:

There are no program changes for this sub program in 2016.

APPROPRIATION ACCOUNT: DAMAGE ASSESSMENT AND RESTORATION REVOLVING FUND

A National Oceanic and Atmospheric Administration (NOAA) Damage Assessment and Restoration Revolving Fund was established, under Section 1012(a) of the Oil Pollution Act, for deposit of sums provided by any party or governmental entity for response to discharges of oil or releases of hazardous substances, for assessment of damages to NOAA trust resources resulting from those discharges and releases, and for the restoration of the injured natural resources. Through the Revolving Fund, NOAA:

Retains funds that are recovered through settlement or awarded by a court for restoration of injured natural resources, and retains reasonable costs of conducting spill response and damage assessments that are recovered by NOAA through negotiated settlement, court award, or other reimbursement.

Ensures funds deposited shall remain available to the trustee, without further appropriation, until expended to pay costs associated with response, damage assessment, and restoration of natural resources.

The NOAA Damage Assessment and Restoration Revolving Fund facilitates and sustains: (1) natural resource damage assessment while the Departments of Commerce and Justice seek full reimbursement from potentially responsible parties; and (2) restoration, replacement, or acquisition of the equivalent of injured or lost natural resources, including resources of National Marine Sanctuaries and National Estuarine Research Reserves, tidal wetlands and other habitats, for which NOAA is trustee. These program functions are conducted jointly within NOAA by the Office of General Counsel, the National Ocean Service, and the National Marine Fisheries Service.

Department of Commerce
 National Oceanic and Atmospheric Administration
 Damage Assessment and Restoration Revolving Fund
SUMMARY OF RESOURCE REQUIREMENTS
 (Dollar amounts in thousands)

	Positions	FTE	Budget Authority	Direct Obligations
FY 2015 Currently Available	16	16	6,170	159,550
less: Obligations from prior year balances	0	0	0	0
less: Unobligated balance transferred, DOI	0	0	0	0
plus: Technical ATBs	0	0	(202)	(138,582)
FY 2016 Base	16	16	5,968	20,968
plus: program Changes	0	0	0	0
FY 2016 Estimate	16	16	5,968	20,968

		FY 2014 Actual		FY 2015 Currently Available		FY 2016 Base Program		FY 2016 Estimate		Increase/Decrease	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
Damage Assessment and Restoration Revolving Fund	Pos/BA	51	3,126	16	6,170	16	5,968	16	5,968	0	0
	FTE/OBL	51	146,766	16	159,550	16	21,000	16	20,968	0	0
Total: Damage Assessment and Restoration Revolving Fund	Pos/BA	51	3,126	16	6,170	16	5,968	16	5,562	0	0
	FTE/OBL	51	146,766	16	159,550	16	20,968	16	20,968	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Damage Assessment and Restoration Revolving Fund
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

	FY 2014		FY 2015		FY 2016		FY 2016		Increase/ Decrease	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Direct Mandatory Obligation	51	146,766	16	159,550	16	20,968	16	20,968	0	0
Total Obligations	51	146,766	16	159,550	16	20,968	16	20,968	0	0
Adjustments to Obligations:										
Federal Funds	0	160	0	0	0	0	0	0	0	0
New offsetting collections	0	(148,461)	0	(36,441)	0	(9,000)	0	(9,000)	0	0
Unobligated balance, adj. SOY	0	(74,835)	0	(110,939)	0	0	0	0	0	0
Unobligated balance transferred (FROM DOI)	0	(2,276)	0	(6,000)	0	(6,000)	0	(6,000)	0	0
Adjustment to Unobligated balance	0	(96)	0	0	0	0	0	0	0	0
Recoveries	0	(29,071)	0	0	0	0	0	0	0	0
Unobligated balance, EOY	0	110,939	0	0	0	0	0	0	0	0
Total Budget Authority	51	3,126	16	6,170	16	5,968	16	5,968	0	0
Financing from Transfers and Other:										
Appropriation previously unavailable	0	(209)	0	(576)	0	(406)	0	(406)	0	0
Transfer to/from DOI	0	(3,493)	0	(6,000)	0	(6,000)	0	(6,000)	0	0
Appropriation temporarily reduced*	0	576	0	406	0	438	0	438	0	0
Net Appropriation	51	0	16	0	16	0	16	0	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Damage Assessment and Restoration Revolving Fund
SUMMARY OF REQUIREMENTS BY OBJECT CLASS
(Dollar amounts in thousands)

Object Class	FY 2014 Actual	FY 2015 Currently Available	FY 2016 Base Program	FY 2016 Estimate	Increase/ Decrease
11 Personnel compensation					
11.1 Full-time permanent	5,299	1,680	1,701	1701	0
11.3 Other than full time permanent	907	309	309	309	0
11.7 Other personnel compensation	43	6	6	6	0
11.8 Special personnel services payments	0	0	0	0	0
11.9 Total personnel compensation	6,249	1,995	2,016	2,016	0
12.1 Civilian personnel Benefits	1,788	554	576	576	0
13 Benefits for former personnel	0	0	0	0	0
21 Travel and transportation of persons	1,042	1,133	149	149	0
22 Transportation of things	3	3	1	1	0
23.1 Rental payments to GSA	75	82	11	11	0
23.2 Rental payments to others	84	92	12	12	0
24 Printing and reproduction	69	25	3	3	0
25.1 Advisory and assistance services	2,756	2,996	394	394	0
25.2 Other services	276	300	39	39	0
25.3 Other purchases of goods and services from Gov't accounts	125,251	142,399	16,455	16,455	0
26 Supplies and materials	865	940	124	124	0
31 Equipment	229	249	33	33	0
41 Grants, subsidies and contributions	8,075	8,777	1,154	1,154	0
42 Insurance claims and indemnities	0	0	0	0	0
43 Interest and dividends	4	5	1	1	0
99 Total Obligations	146,766	159,550	20,968	20,968	0

Department of Commerce
 National Oceanic and Atmospheric Administration
 Damage Assessment and Restoration Revolving Fund
SUMMARY OF REQUIREMENTS BY OBJECT CLASS
 (Dollar amounts in thousands)

	FY 2014 Actual	FY 2015 Currently Available	FY 2016 Base Program	FY 2016 Estimate	Increase/ Decrease
Federal Funds	160	0	0	0	0
Less collections	(148,461)	(36,441)	(9,000)	(9,000)	0
Less Recoveries	(29,071)	(576)	(438)	(438)	0
Less adjustment of unobligated balance brought forward	(96)	(0)	(0)	(0)	
Less unobligated balance, SOY	(74,835)	(110,939)	0	0	0
Plus unobligated balance transferred	(2,276)	(6,000)	(6,000)	(6,000)	0
Plus unobligated balance, EOY	110,939	0	0	0	0
Total Budget Authority	3,126	6,170	5,968	5,968	0
Transfers:					
Appropriation previously unavailable	(209)	(576)	(406)	(406)	
Transfer from DOI	(3,493)	(6,000)	(6,000)	(6,000)	0
Appropriation temporarily reduced	576	406	438	438	0
Discretionary Budget Authority	0	0	0	0	0
Personnel Data					
Full-Time equivalent Employment:					
Full-time permanent	51	16		16	0
Other than full time permanent	0	0		0	0
Total	51	16		16	0
Authorized Positions:					
Full-time permanent	51	16		16	0
Other than full time permanent	0	0		0	0
Total	51	16		16	0

APPROPRIATION ACCOUNT: SANCTUARIES ENFORCEMENT ASSET FORFEITURE FUND

The Sanctuaries Enforcement Asset Forfeiture Fund receives proceeds from civil penalties and forfeiture claims against responsible parties, as determined through court settlements or agreements, for violations of NOAA sanctuary regulations. Penalties received are held in sanctuary site-specific accounts from year to year (technically reimbursables), as the funds are spent on resource protection within the sanctuary site where the penalty or forfeiture occurred. Funds are expended for resource protection purposes which may include all aspects of law enforcement (from equipment to labor), community oriented policing programs, and other resource protection and management measures such as the installation of mooring buoys or restoration of injured resources.

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Department of Commerce
 National Oceanic and Atmospheric Administration
 Sanctuaries Enforcement Asset Forfeiture Fund
SUMMARY OF RESOURCE REQUIREMENTS
 (Dollar amounts in thousands)

	Positions	FTE	Budget Authority	Direct Obligations
FY 2015 Currently Available	0	0	242	458
less: Obligations from prior year balances	0	0	0	0
plus: Technical ATBs	0	0	(82)	(334)
FY 2016 Base	0	0	124	124
plus: program Changes	0	0	0	0
FY 2016 Estimate	0	0	124	124

		FY 2014 Actual		FY 2015 Currently Available		FY 2016 Base Program		FY 2016 Estimate		Increase/Decrease	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
Sanctuaries Enforcement Asset Forfeiture Fund	Pos/BA	0	(34)	0	242	0	124	0	124	0	0
	FTE/OBL	0	198	0	458	0	124	0	124	0	0
Total: Sanctuaries Enforcement Asset Forfeiture Fund	Pos/BA	0	(34)	0	242	0	124	0	124	0	0
	FTE/OBL	0	198	0	458	0	124	0	124	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Sanctuaries Enforcement Asset Forfeiture Fund
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

	FY 2014		FY 2015		FY 2016		FY 2016		Increase/ Decrease	
	Actual		Currently Available		Base Program		Estimate		Decrease	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Direct Mandatory Obligation	0	198	0	458	0	124	0	124	0	0
Total Obligations	0	198	0	458	0	124	0	124	0	0
Adjustments to Obligations:										
New offsetting collections	0	0	0	0	0	0	0	0	0	0
Unobligated balance, adj. SOY	0	(50)	0	0	0	0	0	0	0	0
Unobligated balance, SOY	0	(398)	0	(216)	0	0	0	0	0	0
Unobligated balance, EOY	0	216	0	0	0	0	0	0	0	0
Total Budget Authority	0	(34)	0	242	0	124	0	124	0	0
Financing from Transfers and Other:										
Appropriation previously unavailable	0	(1)	0	(72)	0	(13)	0	(13)	0	0
Appropriation temporarily reduced	0	72	0	13	0	9	0	9	0	0
Net Appropriation	0	37	0	183	0	120	0	120	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Sanctuaries Enforcement Asset Forfeiture Fund
SUMMARY OF REQUIREMENTS BY OBJECT CLASS
(Dollar amounts in thousands)

Object Class	FY 2014 Actual	FY 2015 Currently Available	FY 2016 Base Program	FY 2016 Estimate	Increase/ Decrease
11 Personnel compensation					
11.1 Full-time permanent	0	0	0	0	0
11.3 Other than full time permanent	0	0	0	0	0
11.2 Other personnel compensation	0	0	0	0	0
11.8 Special personnel services payments	0	0	0	0	0
11.9 Total personnel compensation	0	0	0	0	0
12.1 Civilian personnel Benefits	0	0	0	0	0
13 Benefits for former personnel	0	0	0	0	0
21 Travel and transportation of persons	1	4	1	1	0
22 Transportation of things	0	0	0	0	0
23.1 Rental payments to GSA	0	0	0	0	0
23.2 Rental payments to others	0	0	0	0	0
24 Printing and reproduction	8	10	6	6	0
25.1 Advisory and assistance services	69	184	50	50	0
25.2 Other services	0	0	0	0	0
25.3 Other purchases of goods and services from Gov't accounts	0	0	0	0	0
26 Supplies and materials	85	160	47	47	0
31 Equipment	35	100	20	20	0
41 Grants, subsidies and contributions	0	0	0	0	0
42 Insurance claims and indemnities	0	0	0	0	0
43 Interest and dividends	0	0	0	0	0
99 Total Obligations	198	458	124	124	0

Department of Commerce
 National Oceanic and Atmospheric Administration
 Sanctuaries Enforcement Asset Forfeiture Fund
SUMMARY OF REQUIREMENTS BY OBJECT CLASS
 (Dollar amounts in thousands)

	FY 2014 Actual	FY 2015 Currently Available	FY 2016 Base Program	FY 2016 Estimate	Increase/ Decrease
Less collections	0	0	0	0	0
Less unobligated balance, adj SOY	(50)	0	0	0	0
Less unobligated balance, SOY	(398)	(216)	0	0	0
Plus unobligated balance, EOY	216	0	0	0	0
Plus unobligated balance transferred	0	0	0	0	0
Total Budget Authority	(34)	242	124	124	0
Transfers:					
Transfers from Other Accounts	(1)	(72)	(13)	(13)	0
Appropriation temporarily reduced	72	9	9	9	0
Mandatory Appropriation	37	183	120	120	0

**APPROPRIATION ACCOUNT: GULF COAST ECOSYSTEM RESTORATION SCIENCE,
OBSERVATION, MONITORING AND TECHNOLOGY FUND**

The Gulf Coast Ecosystem Restoration Science, Observation, Monitoring and Technology Fund provides funding for the NOAA RESTORE Act Science Program. The purpose of this program is to initiate and sustain an integrative, holistic understanding of the Gulf of Mexico ecosystem and support, to the maximum extent practicable, restoration efforts and the long-term sustainability of the ecosystem, including its fish stocks, fishing industries, habitat, and wildlife through ecosystem research, observation, monitoring, and technology development.

To ensure the best use of resources the Program will coordinate with existing Federal and state science and technology programs, including other activities funded under the RESTORE Act. Section 1604 of the RESTORE Act authorized funding for the Program using 2.5 percent of the Gulf Coast Restoration Trust Fund.

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Department of Commerce
 National Oceanic and Atmospheric Administration
 Gulf Coast Ecosystem Restoration Science, Observation, Monitoring and Technology Fund
SUMMARY OF RESOURCE REQUIREMENTS
 (Dollar amounts in thousands)

	Positions	FTE	Budget Authority	Direct Obligations
FY 2015 Currently Available	0	0	2,078	2,078
less: Obligations from prior year balances	0	0	0	0
plus: Technical ATBs	0	0	0	0
FY 2016 Base	0	0	2,078	2,078
plus: program Changes	0	0	0	0
FY 2016 Estimate	0	0	2,078	2,078

		FY 2014		FY 2015		FY 2016		FY 2016		Increase/Decrease	
		Actual		Currently Available		Base Program		Estimate			
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
Gulf Coast	Pos/BA	0	0	0	2,078	0	2,078	0	2,078	0	0
Restoration Fund	FTE/OBL	0	0	0	2,078	0	2,078	0	2,078	0	0
<hr/>											
Total: Gulf Coast	Pos/BA	0	0	0	2,078	0	2,078	0	2,078	0	0
Restoration Fund	FTE/OBL	0	0	0	2,078	0	2,078	0	2,078	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Gulf Coast Ecosystem Restoration Science, Observation, Monitoring and Technology Fund
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

	FY 2014		FY 2015		FY 2016		FY 2016		Increase/ Decrease	
	Actual		Currently Available		Base Program		Estimate			
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Direct Mandatory Obligation	0	0	0	2,078	0	2,078	0	2,078	0	0
Total Obligations	0	0	0	2,078	0	2,078	0	2,078	0	0
Adjustments to Obligations:										
New offsetting collections	0	0	0	0	0	0	0	0	0	0
Unobligated balance, adj. SOY	0	0	0	0	0	0	0	0	0	0
Unobligated balance, EOY	0	0	0	0	0	0	0	0	0	0
Total Budget Authority	0	0	0	2,078	0	2,078	0	2,078	0	0
Financing from Transfers and Other:										
Transfer from Other Accounts	0	0	0	0	0	0	0	0	0	0
Appropriation temporarily reduced	0	0	0	0	0	0	0	0	0	0
Net Appropriation	0	0	0	2,078	0	2,078	0	2,078	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Gulf Coast Ecosystem Restoration Science, Observation, Monitoring and Technology Fund
SUMMARY OF REQUIREMENTS BY OBJECT CLASS
(Dollar amounts in thousands)

Object Class	FY 2014 Actual	FY 2015 Currently Available	FY 2016 Base Program	FY 2016 Estimate	Increase/ Decrease
11 Personnel compensation					
11.1 Full-time permanent	0	0	0	0	0
11.3 Other than full time permanent	0	0	0	0	0
11.2 Other personnel compensation	0	0	0	0	0
11.8 Special personnel services payments	0	0	0	0	0
11.9 Total personnel compensation	0	0	0	0	0
12.1 Civilian personnel Benefits	0	0	0	0	0
13 Benefits for former personnel	0	0	0	0	0
21 Travel and transportation of persons	0	0	0	0	0
22 Transportation of things	0	0	0	0	0
23.1 Rental payments to GSA	0	0	0	0	0
23.2 Rental payments to others	0	0	0	0	0
24 Printing and reproduction	0	0	0	0	0
25.1 Advisory and assistance services	0	2,078	2,078	2,078	0
25.2 Other services	0	0	0	0	0
25.3 Other purchases of goods and services from Gov't accounts	0	0	0	0	0
26 Supplies and materials	0	0	0	0	0
31 Equipment	0	0	0	0	0
41 Grants, subsidies and contributions	0	0	0	0	0
42 Insurance claims and indemnities	0	0	0	0	0
43 Interest and dividends	0	0	0	0	0
99 Total Obligations	0	2,078	2,078	2,078	0

Department of Commerce
 National Oceanic and Atmospheric Administration
 Gulf Coast Ecosystem Restoration Science, Observation, Monitoring and Technology Fund
SUMMARY OF REQUIREMENTS BY OBJECT CLASS
 (Dollar amounts in thousands)

	FY 2014 Actual	FY 2015 Currently Available	FY 2016 Base Program	FY 2016 Estimate	Increase/ Decrease
Federal Funds	0	0	0	0	0
Less collections	0	0	0	0	0
Less unobligated balance, SOY	0	0	0	0	0
Plus unobligated balance, EOY	0	0	0	0	0
Plus unobligated balance transferred	0	0	0	0	0
Total Budget Authority	0	2,078	2,078	2,078	0
Transfers:					
Transfers from Other Accounts	0	0	0	0	0
Appropriation temporarily reduced	0	0	0	0	0
Discretionary Budget Authority	0	2,078	2,078	2,078	0

BUDGET PROGRAM: NATIONAL MARINE FISHERIES SERVICE

For FY 2016, NOAA requests a total of \$990,121,000 and 2,981 FTE for the National Marine Fisheries Service, including an increase of \$54,987,000 and 53 FTE in net program changes.

National Marine Fisheries Service Overview

The National Marine Fisheries Service (NMFS) is responsible for the management and conservation of living marine resources within the U.S. Exclusive Economic Zone (EEZ)—the area extending from three to 200 nautical miles offshore. NMFS provides critical support, and scientific and policy leadership in the international arena, and plays a key role in the management of living marine resources in coastal areas under state jurisdiction. NMFS implements science-based conservation and management actions aimed at sustaining long-term use and promoting the health of coastal and marine ecosystems for the Nation’s benefit. Programmatic authority for fisheries management, species protection, and habitat conservation activities is derived primarily from the Magnuson-Stevens Fishery Conservation and Management Act (MSA), Marine Mammal Protection Act (MMPA), and Endangered Species Act (ESA). Other acts provide additional authority for enforcement, seafood safety, habitat restoration, and cooperative efforts with states, tribes, interstate fishery commissions, and other countries. All of these activities rely on a strong scientific and research competency to support the challenging public policy decision process associated with NMFS’s stewardship responsibility.

NOAA is proposing to restructure NMFS’ budget line items in FY 2016 to improve the coordination and collaboration among activities that service its interwoven missions and mandates. This restructure will better align NMFS’ budget to its programmatic and organizational needs, providing increased transparency and accountability. The need for financial management efficiency in designating programs within one PPA or another was taken into account and is reflected in the base narrative that follows. There may be cases where activities funded in one PPA may also fit into another PPA, but NMFS elected not to split program funding among multiple PPAs to simplify transition to the new structure and reduce implementation complexity. See the chart below for a detailed crosswalk of the budget line restructure.

Current Sub Program	Current PPA	Proposed Sub Program	Proposed PPA
Protected Species Research and Management	Protected Species Research and Management Programs	Protected Resources Science and Management	Marine Mammals, Sea Turtles and Other Species
Protected Species Research and Management	Species Recovery Grants	Protected Resources Science and Management	Marine Mammals, Sea Turtles and Other Species
Protected Species Research and Management	Marine Mammals	Protected Resources Science and Management	Marine Mammals, Sea Turtles and Other Species
Protected Species Research and Management	Marine Turtles	Protected Resources Science and Management	Marine Mammals, Sea Turtles and Other Species
Protected Species Research and Management	Other Protected Species (Marine Fish, Plants, and Invertebrates)	Protected Resources Science and Management	Marine Mammals, Sea Turtles and Other Species
Protected Species Research and Management	Atlantic Salmon	Protected Resources Science and Management	ESA Salmon
Protected Species Research and Management	Pacific Salmon	Protected Resources Science and Management	ESA Salmon

Fisheries Research and Management	Fisheries Research and Management Programs	Protected Resources Science and Management/ Fisheries Science and Management/ Habitat Conservation and Restoration	Marine Mammals, Sea Turtles and Other Species/ Fisheries and Ecosystem Science Programs and Services/ Fisheries Management Programs and Services/ Habitat Management and Restoration
Fisheries Research and Management	National Catch Share Program	Fisheries Science and Management	Fisheries Management Programs and Services
Fisheries Research and Management	Expand Annual Stock Assessments - Improve Data Collection	Fisheries Science and Management	Fisheries Data Collections, Surveys, and Assessments
Fisheries Research and Management	Economics & Social Sciences Research	Fisheries Science and Management	Fisheries and Ecosystem Science Programs and Services
Fisheries Research and Management	Salmon Management Activities	Fisheries Science and Management	Salmon Management Activities
Fisheries Research and Management	Regional Councils and Fisheries Commissions	Fisheries Science and Management	Regional Councils and Fisheries Commissions
Fisheries Research and Management	Fisheries Statistics	Fisheries Science and Management	Fisheries Data Collections, Surveys, and Assessments
Fisheries Research and Management	Fish Information Networks	Fisheries Science and Management	Fisheries Data Collections, Surveys, and Assessments
Fisheries Research and Management	Survey and Monitoring Projects	Fisheries Science and Management	Fisheries Data Collections, Surveys, and Assessments/ Habitat Management and Restoration
Fisheries Research and Management	Fisheries Oceanography	Fisheries Science and Management	Fisheries and Ecosystem Science Programs and Services
Fisheries Research and Management	American Fisheries Act	Fisheries Science and Management	Fisheries Data Collections, Surveys, and Assessments/ Fisheries Management Programs and Services
Fisheries Research and Management	Interjurisdictional Fisheries Grants	Fisheries Science and Management	Regional Councils and Fisheries Commissions
Fisheries Research and Management	National Standard 8	Fisheries Science and Management	Fisheries and Ecosystem Science Programs and Services
Fisheries Research and Management	Reducing Bycatch	Fisheries Science and Management	Observers and Training/ Fisheries Management Programs and Services
Fisheries Research and Management	Product Quality and Safety	Fisheries Science and Management	Fisheries Management Programs and Services
Enforcement & Observers/Training	Enforcement	Enforcement	Enforcement
Enforcement & Observers/Training	Observers/Training	Fisheries Science and Management	Observers and Training
Habitat Conservation & Restoration	Sustainable Habitat Management	Habitat Conservation and Restoration	Habitat Management and Restoration
Habitat Conservation & Restoration	Fisheries Habitat Restoration	Habitat Conservation and Restoration	Habitat Management and Restoration

Other Activities Supporting Fisheries	Antarctic Research	Fisheries Science and Management	Fisheries and Ecosystem Science Programs and Services
Other Activities Supporting Fisheries	Aquaculture	Fisheries Science and Management	Fisheries Management Programs and Services
Other Activities Supporting Fisheries	Climate Regimes & Ecosystem Productivity	Fisheries Science and Management	Fisheries and Ecosystem Science Programs and Services
Other Activities Supporting Fisheries	Computer Hardware and Software	Fisheries Science and Management	Fisheries and Ecosystem Science Programs and Services
Other Activities Supporting Fisheries	Cooperative Research	Fisheries Science and Management	Fisheries Data Collections, Surveys, and Assessments
Other Activities Supporting Fisheries	Information Analyses & Dissemination	Fisheries Science and Management	Fisheries and Ecosystem Science Programs and Services
Other Activities Supporting Fisheries	Marine Resources Monitoring, Assessment & Prediction Program	Fisheries Science and Management	Fisheries Data Collections, Surveys, and Assessments
Other Activities Supporting Fisheries	National Environmental Policy Act (NEPA)	Protected Species Research and Management/ Fisheries Science and Management	Marine Mammals, Sea Turtles and Other Species/ Fisheries Management Programs and Services
Other Activities Supporting Fisheries	NMFS Facilities Maintenance	Fisheries Science and Management	Fisheries and Ecosystem Science Programs and Services
Other Activities Supporting Fisheries	Regional Studies	Fisheries Science and Management/ Habitat Conservation and Restoration	Fisheries Data Collections, Surveys, and Assessments/ Habitat Management and Restoration

In the new structure, the National Marine Fisheries Service budget is organized into four sub-programs under the Operations, Research, and Facilities appropriation account (\$836,549,000 and 2,888 FTE):

- Protected Resources Science and Management (\$184,589,000 and 811 FTE) includes Marine Mammals, Sea Turtles and Other Species, and ESA Salmon.
- Fisheries Science and Management (\$528,578,000 and 1,706 FTE) includes Fisheries and Ecosystem Science Programs and Services; Fisheries Data Collections, Surveys, and Assessments; Observers and Training; Fisheries Management Programs and Services; Salmon Management Activities; and Regional Councils and Fisheries Commissions.
- Enforcement (\$66,168,000 and 217 FTE) includes Enforcement.
- Habitat Conservation and Restoration (\$57,214,000 and 154 FTE) includes Habitat Management and Restoration.

The National Marine Fisheries Service budget includes the following other accounts:

- Fishermen's Contingency Fund
- Pacific Coastal Salmon Recovery Fund
- Promote and Develop American Fishery Products & Research Pertaining to American Fisheries, which includes Saltonstall-Kennedy (S-K) Funds

- Environmental Improvement and Restoration Fund
- Limited Access System Administration Fund
- Foreign Fishing Observer Fund
- Marine Mammal Unusual Mortality Event Fund
- Federal Ship Financing Fund
- Fisheries Finance Program Account
- Western Pacific Sustainable Fisheries Fund
- Fisheries Enforcement Asset Forfeiture Fund
- North Pacific Observer Fund
- Fisheries Disaster Assistance Fund

Work is conducted by NMFS field elements, with oversight, review, and direction provided from NMFS headquarters in Silver Spring, Maryland. The field structure consists of five Regional Offices and six Science Centers that conduct research and direct work carried out by the other laboratories and satellite/special purpose facilities in that region.

Major NMFS facilities are located at the following sites:

Greater Atlantic:	Regional Office - Gloucester, MA Science Center - Woods Hole, MA Major Laboratories - Milford, CT; Narragansett, RI; J. J. Howard, Sandy Hook, NJ Satellite/Special Purpose Facilities - Smithsonian (National Systematics Lab), Washington, DC
Southeast:	Regional Office - St. Petersburg, FL Science Center - Miami, FL Major Laboratories - Beaufort, NC; Galveston, TX; Panama City, FL; Pascagoula, MS Satellite/Special Purpose Facilities - Stennis Space Center Bay, St. Louis, MS
West Coast:	Regional Office – Seattle, WA at Sand Point; Portland, OR; Long Beach, CA
Southwest:	Science Center - La Jolla, CA Major Laboratories - Santa Cruz, CA Satellite/Special Purpose Facilities – Pacific Grove, CA
Northwest:	Science Center - Seattle, WA at Montlake Satellite/Special Purpose Facilities - Manchester, WA; Mukilteo, WA; Pasco, WA; Newport, OR; Hammond, OR
Alaska:	Regional Office - Juneau, AK Science Center - Seattle, WA at Sand Point Major Laboratories – Ted Stevens Marine Research Institute, AK; Auke Bay, AK; Kodiak, AK Satellite/Special Purpose Facilities - Little Port Walter, AK
Pacific Islands:	Regional Office – Honolulu, HI Science Center – Honolulu, HI

Research and Development (R&D) Investments:

The NOAA FY 2016 Budget estimates for R&D investments are the result of an integrated requirements-based strategic planning process. This process provides the structure to link NOAA's strategic vision with programmatic detail and budget development, with the goal of maximizing resources while optimizing capabilities. NMFS requests \$76,822,000 for investments in R&D in the FY 2016 budget.

The NOAA Research Council- an internal body composed of senior scientific personnel from every Line Office in the agency- developed NOAA's most recent Five-Year Research and Development Plan (FY 2013-2017). This plan guides NOAA's R&D activities and provides a common understanding among NOAA's leadership, its workforce, its partners, constituents and Congress on the value of NOAA's R&D activities.

Significant Inflationary Adjustments:

NOAA's FY 2016 Base includes a total of \$14,411,000 and 0 FTE to account for the full funding requirement for inflationary adjustments to current programs for NMFS activities. This includes the estimated 2016 Federal pay raise of 1.3 percent as well as inflationary increases for non-labor activities, including service contracts, utilities, field office lease payments, and rent charges from the General Services Administration (GSA).

Headquarters Administrative Costs:

In FY 2016 NMFS Line Office headquarters will use \$26,907,793 in funds to support general management activities, financial and budgeting, and IT related expenses, as well as supporting facilities and other general operating costs. These funds also include support for service contracts, utilities, and rent charges from the General Services Administration. Specifically, NMFS will use headquarters administrative funds to support the following:

Headquarters Program Support Type	Description	FY 2016 Estimated Amount	FY 2016 FTE Associated with NMFS
General Management & Direction/Executive Management	Includes Assistant Administrator's office, public affairs, information services	\$10,286,282	38.7
Budget & Finance	Includes Budget, Finance and Accounting	\$6,881,604	25.0
Facilities/Other Administrative (CAO Functions)	Includes Facilities and Security costs, as well as other CAO related activities	\$1,410,196	6.0
Human Resources	All HR services, including EEO	\$2,685,618	13.7
Acquisitions and Grants		\$447,301	3.0
Information Technology	Includes IT-related expenses and other CIO related activities	\$5,196,792	20.6
Total		\$ 26,907,793	107.0

**APPROPRIATION ACCOUNT: OPERATIONS, RESEARCH, AND FACILITIES
SUB-PROGRAM: PROTECTED RESOURCES SCIENCE AND MANAGEMENT**

The mission of the Protected Resources Science and Management sub-program is to assess, understand, and protect the health of protected species, the ecosystems that sustain them, and the communities that value and depend on them. The program, in partnership with internal and external stakeholders, uses best available science from assessment and monitoring programs to develop and implement best practices and conservation actions to reduce threats to protected species and their marine and coastal ecosystems. Protected species include those listed under the Endangered Species Act (ESA) and marine mammals covered by the Marine Mammal Protection Act (MMPA). Having a better understanding about protected species abundance and distribution patterns within the U.S. EEZ can help avoid unnecessary regulatory restrictions on industry and other users of living marine resources.

NMFS implements the ESA and MMPA with the U.S. Fish and Wildlife Service (USFWS). In general, USFWS is responsible for the conservation of terrestrial and freshwater aquatic organisms, some marine mammals, and marine turtles on their nesting beaches. NMFS is responsible for the conservation of most marine mammals, most marine and anadromous fish, marine turtles at sea, marine invertebrates (including corals), and marine plants. In addition, the Marine Mammal Commission provides oversight and makes recommendations to NMFS on priority marine mammal issues, and three regional Scientific Review Groups provide independent review of our marine mammal stock assessments.

Programs related to protected species are administered through the following budget line items:

Marine Mammals, Sea Turtles, and Other Species

Primarily under the legislative authority of the ESA and MMPA, this budget line supports activities that conserve and recover species threatened or endangered with extinction, as well as most marine mammals. This effort is critical to ensuring biological sustainability of all marine and anadromous species and the ecosystems on which they depend, and it supports economic development in a manner compatible with species conservation and recovery.

Major components of this budget line include:

Interagency Consultation (ESA Section 7): ESA Section 7 requires Federal agencies to ensure that any action they fund, authorize, or undertake is not likely to jeopardize the continued existence of threatened or endangered species or result in the destruction or adverse modification of critical habitat that has been designated for these species. This consultation with Federal action agencies is critical to inform decision-making regarding authorization for lawful activities—such as construction of roads and bridges, commercial fishing, or defense readiness training—to be implemented in a manner that is compatible with species conservation and recovery.

Listing: Any U.S. citizen or organization may petition NMFS to list a species as threatened or endangered, reclassify an already listed species, or revise designated critical habitat under the ESA. Once a petition is received, the ESA outlines deadlines that must be

followed including 90 days for an initial determination and 12 months for determining whether the listing or reclassification is warranted. If warranted, NMFS must then publish a proposed rule to list the species. NMFS then considers public comments and any new information that might become available and must publish a final determination within one year after the date of publishing the proposed rule. The ESA also generally requires that critical habitat be designated concurrently with the final listing.

Once a species is listed, NMFS is required by the ESA to develop a recovery plan and implement the protections of the ESA. When a species is listed as endangered, the ESA prohibits any harm to it. However, if the species is listed as threatened, NMFS must issue separate protective regulations under ESA Section 4(d) in order to specify the prohibitions against harming the species.

Species Recovery Grants: Recovery and conservation actions for ESA-listed species under NMFS jurisdiction are implemented through Species Recovery Grants, which are awarded to states and tribes under the authority of ESA Section 6 and the Fish and Wildlife Coordination Act. For listed species, funding supports activities such as reducing or removing significant sources of mortality and injury, assessing and monitoring species status and trends, developing conservation plans, conserving habitat, and engaging the public in conservation efforts. Funding may also support monitoring of candidate species and recently de-listed species.

Conservation Planning (ESA Section 10): When non-Federal entities such as states, counties, local governments, and private landowners wish to conduct an otherwise lawful activity that might incidentally, but not intentionally, “take” a listed species, an incidental take permit must first be obtained from NMFS. To receive a permit, the applicant must submit a Conservation Plan designed to offset harmful effects a proposed activity might have on listed species.

Permits and Authorizations: Under authority of the ESA and MMPA, NMFS issues permits and authorizations to conduct activities that may result in the direct and indirect take (harassing, hunting, capturing, harming, killing, or collecting) of a protected species. Permits and take authorizations cover scientific research and the incidental take and harassment of marine mammals by otherwise lawful activities such as seismic surveys, construction activities, or Navy training exercises when those activities are deemed to have negligible impact to the species.

Species Stock Assessment and Monitoring: This program supports protected species stock assessment and monitoring activities using a variety of observation platforms and survey methods including use of marine acoustics, unmanned systems, ship, aerial, and shore-based surveys, and telemetry. To adequately support management decisions, assessments are comprehensive and include estimates of abundance and distribution; analysis of historical trends, serious injury and mortality levels; life history and demographics; and, impacts of human activities, noise, climate, habitat, and ecosystem change. Without the collection of these basic assessment data, monitoring and mitigation requirements for industry can be more rigorous to compensate for uncertain science.

Marine Mammals: Under the legislative authority of MMPA, NMFS implements several specific activities for marine mammal conservation. NMFS has entered into agreements with Alaska Native groups regarding the management of harvested marine mammal stocks in

Alaska. These agreements provide funding for cooperative management of these stocks. Nationally, in fisheries where marine mammal interaction is occasional to frequent, NMFS works collaboratively with the commercial fishing industry and other stakeholders to identify measures through the take reduction planning process to reduce the impact of commercial fisheries on marine mammals. NMFS also conducts research to address management actions focusing on specific questions concerning the biology, behavior, and health of marine mammal species, status of populations within the larger marine ecosystem, genetic differentiation, ecosystem interactions, and effects of human activities on the sustainability of marine mammals on regional and international scales. Finally, NMFS is the lead Federal agency to coordinate stranding networks, responses and investigations of marine mammal mortality events, biomonitoring, tissue and serum banking, and analytical quality assurance.

Marine Turtles: Under the legislative authority of the ESA, NMFS and USFWS implement the identification, listing, and recovery of threatened and endangered marine turtles. All six species of sea turtles occurring in the United States are protected under the ESA. NMFS has the lead responsibility in the marine environment, and USFWS has the lead on nesting beaches. Major threats to sea turtles in the United States include bycatch in commercial and recreational fisheries, destruction and alteration of nesting and foraging habitats, and vessel strikes. To reduce the bycatch in commercial fisheries, NMFS uses fishery observer programs to document the bycatch of sea turtles, researches and develops alternative fishing practices and gear to reduce bycatch, and promulgates regulations to implement solutions to sea turtle bycatch in U.S. fisheries known for significant bycatch (such as shrimp trawl fishery and pelagic longline fisheries). NMFS and USFWS have developed recovery plans to guide research and management efforts necessary for each sea turtle species.

Because sea turtles are highly migratory, their conservation and recovery require multilateral cooperation and agreements. The international component of the sea turtle program facilitates the global conservation and recovery of sea turtles by working closely with other nations through diplomatic channels, capacity building, and scientific exchange.

ESA Salmon

Atlantic Salmon: Gulf of Maine Atlantic salmon are co-managed by NMFS, USFWS, the Maine Department of Marine Resources, and the Penobscot Indian Nation, representing all of the tribes in Maine on this issue. Under the legislative authority of the ESA and a joint Statement of Cooperation with the co-managers, NMFS has responsibility for marine stock assessments, designating critical habitat, estuary and marine Section 10 and Section 7 implementation, and minimizing dam impacts. The major threats to Atlantic salmon are dams and their inter-related effects on freshwater salmon habitat, such as impeding access to spawning habitat for returning adult salmon and low marine survival. NMFS continues to work to remove and/or modify these barriers to improve the population status of Atlantic salmon.

Pacific Salmon: Under the legislative authority of the ESA, NMFS implements stock assessments, interagency Section 7 consultations, and listing and recovery actions to protect and recover threatened and endangered Pacific salmon. Population declines and extirpations of Pacific salmon and steelhead are the result of numerous factors affecting habitat (such as hydropower development, land development, resource extraction, timber harvest practices, and other land uses), as well as effects from harvest, hatchery practices, natural variation in ocean climate conditions, and other factors such as predation and the introduction of non-native species. These threats affect each listed species differently, and no single factor is solely responsible for declines. Loss of habitat ultimately limits the ability of salmon and

steelhead populations to adapt to natural and human-caused changes.

NMFS is also responsible for ensuring that hydroelectric facilities do not compromise the survival of salmon and steelhead that must pass through them while migrating. The majority of hydroelectric dams lack adequate fish passage. To stem the loss of habitat critical for listed salmonids, NMFS works to develop and implement ESA Section 10 habitat conservation plans with Federal and state partners whose actions affect these resources.

NMFS works with these same partners to improve fish passage through hydroelectric dams through ESA Section 7 interagency consultation. In addition, NMFS consults with the Environmental Protection Agency to assess the adverse effects of pesticide ingredients on threatened and endangered salmonids.

Schedule and Milestones:

FY 2016–2020

- Review listing petitions and issue 90-day findings, conduct ESA status reviews and issue 12-month findings, and promulgate ESA protective regulations.
- Prepare recovery plans and designate critical habitat
- Implement recovery actions identified in recovery plans to improve the status of ESA listed species
- Provide technical assistance, consultation, and authorization services for all Federal agencies' proposed actions (ESA Section 7)
- Continue development and implementation of 10 TRTs to achieve MMPA goals through increased compliance monitoring and bycatch assessments.
- Evaluate effectiveness and recommend enforcement measures, modify existing regulations, and add protective measures to reduce marine mammal bycatch in fisheries
- Conduct comprehensive protected species stock assessments
- Develop additional Section 6 agreements with Connecticut, and American Samoa.
- Solicit, review and award Species Recovery Grants to states and tribes for conservation and recovery activities
- Respond to marine animal strandings and unusual mortality events
- Solicit and review Prescott grant proposals submitted by stranding networks for marine animal stranding activities
- Participate in international and regional agreements to further the U.S. policy on protected species conservation

Deliverables:

FY 2016–2020

- Completion of ESA proposed and final listing regulations, Section 4(d) rules, and critical habitat regulations
- Completion of formal and informal consultation with other Federal agencies
- Recovery plans with specific actions to prevent species extinction
- Timely issuance of MMPA and ESA permits
- Facilitation of TRTs to reduce marine mammal and sea turtle bycatch in fisheries that meet MMPA requirements
- Comprehensive strategies for assessing the effectiveness of each marine mammal take reduction plan
- Improved or newly developed abundance and fishery mortality

estimates for stocks in Alaska, the Pacific Islands, and the Gulf of Mexico to inform management decisions

- Identification of protected species stocks having inadequate information to inform future management decisions
- Annual compilation of protected species information needs internal and external to NMFS

Performance Goals and Measurement Data:

Performance Measure: Number of Protected Species Designated as Threatened, Endangered or Depleted with Stable or Increasing Population Levels (Measure 3.4d)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	37/84* (34/72)	34/74	34/91	34	34	34	34
<p>Description: This measure tracks progress at achieving partial recovery of endangered, threatened, or depleted protected species under the jurisdiction of the National Marine Fisheries Service (NMFS). These species include those listed as threatened or endangered under the Endangered Species Act (ESA) as well as those marine mammal species listed as “depleted” under the Marine Mammal Protection Act (MMPA). Recovery of threatened, endangered, or depleted species can take decades, so while it may not be possible to recover or de-list a species in the near term, progress can be made to stabilize or increase the species population. For some, this means trying to stop a steep decline, while for others it means trying to increase their numbers. As of FY 2015, this measure tracks 74 species/stocks designated as threatened, endangered, or depleted.</p> <p>* NOAA begins tracking newly listed species a full fiscal year after they were listed. In FY 2014, NOAA added five distinct population segments (DPS) of Atlantic sturgeon that were listed on February 6, 2012. In FY 2015 NOAA will start tracking one DPS of bearded seal, one DPS of ringed seal, and one DPS of false killer whale. NOAA also stopped tracking the Eastern DPS of Steller sea lion delisted on November 4, 2014. For FY 2015, NOAA changed the level at which listed whales are tracked from stocks to species. As a result, NOAA adjusted its baseline by consolidating 17 stocks of large whales into five species. In FY 2016 NOAA will begin tracking 14 coral species and three scalloped hammerhead shark DPS.</p>							

Performance Measure: Percent of Protected Species with Adequate Population Assessments and Forecasts (Measure 3.4c)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	15.0% (62/412)	21.6% (89/412)	21.4% (92/429)	20.7% (89/429)	22.1% (95/429)	22.8% (98/429)	22.6% (97/429)

Description: This measure tracks the percentage of protected species stocks for which adequate assessments are available to determine the scientific basis for supporting and evaluating the impact of management actions. To reach this standard, which is defined as “Tier 2 and Tier 3” by the Protected Species Stock Assessment Improvement Plan (SAIP), assessments must be based on recent quantitative or qualitative analysis sufficient to determine current stock status based on a variety of data category levels such as life history, threats, stock structure, assessment quality, assessment frequency, and , abundance. This measure covers the protected species stocks covered by the MMPA or listed under the ESA. Note that the number of such stocks can change as new species are listed and as new stocks of listed species and marine mammals are identified.

Performance Measure: Number and Percentage of Recovery Actions Ongoing or Completed (Measure 3.4e)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	2013/ 4457 (45.2%)	2070/ 4482 (46.2%)	2119/ 4482 (47.3%)	2165/ 4482 (48.3%)	2213/ 4482 (49.4%)	2259/ 4482 (50.4%)	2302/ 4482 (51.4%)

Description: This measure tracks the progress of ongoing or completed recovery actions (including Priority 1 actions needed to prevent extinction) included in NMFS approved recovery plans for species listed as threatened or endangered under the ESA. Recovery actions are those actions found to be necessary to remove species from listing under the ESA. They are identified, quantified to the extent possible, ranked in importance (in preventing extinction and promoting recovery), and described in species recovery plans. Actions may include items that can be completed in a year or actions that may take many years to complete or that may be ongoing (such as monitoring).

Recovery of threatened or endangered species is a gradual process that can take decades; completed recovery actions can show incremental progress made toward recovery.

Performance Measure: Number of Section 7 formal consultations and authorizations prepared for proposed Federal activities	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	185	200	200	200	200	200	200

Description: Increased consultations and related authorizations represent incremental improvement in performance by increased capacity and improvement in efficiencies in out years. This measure assumes a base of 200 formal consultations based on prior year history.

PROGRAM CHANGES FOR FY 2016:

Marine Mammals, Sea Turtles and Other Species: Increase Consultation Capacity (Base Funding¹: \$117,389,000 and 467 FTE; Program Change: +\$13,230,000 and +26 FTE): NOAA requests an increase of \$13,230,000 and 26 FTE for a total of \$130,619,000 and 493 FTE to increase consultation and permitting capacity mandated by sections 7 and 10 of the Endangered Species Act (ESA) and sections 104 and 101(a)(5) of the Marine Mammal Protection Act (MMPA). In addition, this funding will support ESA requirements for 20 coral species listed as threatened on September 10, 2014.

The initiative to broadly invigorate NOAA's consultation capacity also addresses needs with regard to the MSA provisions for essential fish habitat (EFH). The balance of the consultation initiative is addressed by a complementary program change of \$5,671,000 and 12 FTE located within the 'Habitat Management and Restoration' PPA.

Proposed Actions:

NOAA is facing four emerging large-scale natural resource management and conservation issues that will challenge its ability to meet consultation and permitting requirements under the ESA and MMPA:

1. additional consultation and permitting requirements related to the California drought;
2. significantly increasing consultation and permitting needs in the Southeast and the Pacific Island Regions in response to new coral species listings;
3. additional consultation and permitting requirements resulting from Gulf of Mexico restoration activities related to the Deepwater Horizon oil spill; and
4. compliance with *Executive Order 13604 for Improving Performance of Federal Permitting and Review of Infrastructure Projects*.

The proposed funding will increase NOAA's capacity to conduct ESA section 7 consultations and issue MMPA permits. Activities include providing technical assistance, reviewing permits, conducting formal and informal consultations, and engaging in post-project implementation monitoring and adaptive management to ensure that project improvements are realized. NOAA will also undertake more programmatic consultations, which create efficiencies by establishing a framework by which individual projects can be planned, authorized, and implemented as well as establishing consistencies across larger areas, often on regional or national scales.

NMFS will direct \$3.2 million of the funding to implement ESA requirements for the 20 newly listed coral species, including section 7 consultations. The listing rule identifies 19 threats to the survival of coral, including: rising ocean temperatures, ocean acidification, coral disease, fishing, land-based sources of pollution, and damage from marine/coastal construction and development activities. To better understand those threats and identify specific actions to conserve these corals, NMFS will increase coral research with partners. This information will be used to develop recovery plans that will identify the actions that NOAA or other agencies and stakeholders can take to reduce or eliminate threats that are determined to impede coral recovery. Once the plans are finalized, NMFS will track the

¹ Base funding amount reflects the entire Marine Mammals, Sea Turtles and Other Species PPA because funding for consultation efforts reflects annual priorities and also exists in the ESA Salmon PPA. The total estimated base within this PPA for consultation efforts in FY 2016 is \$9.5 million.

initiation and completion of recovery actions through the Recovery Online Activity Reporting System.

NOAA will direct the remaining \$10.0 million increase to other Section 7 consultations and MMPA permit reviews. This initiative supports the Cross-Agency Priority (CAP) Goal for Infrastructure Permitting Modernization. With increased capacity, NOAA will reduce delays and improve permitting and review timeframes for projects that benefit the Nation's economy and create new jobs.

Statement of Need and Economic Benefits:

Permitting delays can have significant economic impact. For example, in January 2014, a chemical company seeking a permit from EPA alerted NMFS that they were within weeks of losing \$587.0 million in private equity capital because the contract was tied to a fixed permitting schedule. In this case, NMFS was able to set aside other consultations and complete this one with EPA, allowing the project to move forward; however, this illustrates the economic risks of consultation delays.

NOAA is required to complete the formal Section 7 consultation process within 135 days or, when extended, to a date set by mutual agreement of the action agency and NMFS. NMFS policy is to complete informal consultations within a non-statutory timeframe of 30 days, when possible. Unfortunately, consultation backlogs and delays in permitting exist due to the high volume of consultation requests that NMFS receives relative to staff available to meet demand. With the existing backlog, NMFS will not be able to fully address new demands, specifically those brought on by the four emerging large-scale natural resource management and conservation issues mentioned above.

The consequences of incomplete or delayed Section 7 consultations and permitting for research and enhancement include, delayed economic activity, potential damage to NOAA trust resources as well as litigation risk, hampered decision-making, and NOAA's exposure to political controversy.

NOAA had been making progress in the percentage of consultations completed within the statutory timeframe and reducing the backlog, but the combination of new ESA listings (e.g., Atlantic sturgeon, corals), and a large number of unexpected requests for consultations following natural disasters (such as the Deepwater Horizon Oil Spill, Superstorm Sandy, and the California drought) has significantly eroded progress to further reduce the backlog. Over the past six years, NOAA has received an average of 1,500 requests for consultations per year – at the end of FY 2014, NOAA had a backlog of 688 consultations (153 formal, 535 informal), compared to 377 in FY 2013. NMFS Section 7 biologists conduct an average of 20 consultations each year although, for large consultations, multiple biologists may work on one consultation. For example, three to five biologists work on consultations with the Environmental Protection Agency for re-registering each of 37 pesticide active ingredients. As new species are listed and permits are required for research and enhancement, NOAA's ability to review applications, provide technical assistance to applicants, and issue permits in a timely manner are diminished due to lack of corresponding increase in staff capacity. NOAA's relatively low on-time completion rate (50 percent target for FY 2016) has impacted other agencies' ability to complete their projects (permitting or funding of roads, bridges, water projects, etc.).

Resource Assessment:

The resources for this activity are described in the Protected Resources Science and

Management narrative.

Schedule and Milestones:

FY 2016–2020:

- Provide technical assistance, consultation and authorization services for all Federal agencies’ proposed actions
- Develop programmatic consultation mechanics
- Prepare ESA Section 4(d) rules for the newly listed coral species
- Prepare ESA rule to designate critical habitat for the newly listed coral species
- Conduct research to understand threats and recovery actions for the newly listed coral species
- Develop recovery plans for newly listed coral species
- Update the Recovery Online Activity Reporting System with recovery actions initiated.

Deliverables:

FY 2016–2020:

- Conduct formal and informal consultation to other Federal agencies
- 100-115 additional formal ESA section 7 consultations conducted per year
- 5 additional ESA section 10 take permits issued per year
- Final protective regulations (Section 4(d) rules), recovery plans and critical habitat designations for the newly listed coral species
- Completed Section 7 consultations
- Updated Recovery Online Activity Reporting System

Performance Goals and Measurement Data:

Performance Measure: Number of Section 7 formal consultations and authorizations prepared for proposed Federal activities	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	300	300	305	315	315
Without Increase	185	200	200	200	200	200	200
Description: Increased consultations and related authorizations represent incremental improvement in performance by increased capacity and improvement in efficiencies in out years. This measure assumes a base of 200 formal consultations received based on prior year history.							

Performance Measure: Percent of Section 7 Consultations Completed on Time	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	65%	65%	67%	70%	70%
Without Increase	29.5%	50%	50%	50%	50%	50%	50%
Description: This measure provides the percentage of consultations completed within a fiscal year. This measure assumes a base of 1500 formal and informal consultations based on prior year history.							

PROGRAM CHANGE PERSONNEL DETAIL

Budget Program: National Marine Fisheries Service
Sub-program: Protected Resources Science and Management
Program Change: Marine Mammals, Sea Turtles and Other Species

Title:	Location	Grade	Number of Positions	Annual Salary	Total Salaries
Fishery Biologist	St. Petersburg, FL	ZP-3	9	\$57,982	\$521,838
Fishery Biologist	Honolulu, HI	ZP-3	9	\$59,175	\$532,575
Fishery Biologist	Sacramento, CA	ZP-3	5	\$62,065	\$310,325
Fishery Biologist	Silver Spring, MD	ZP-3	3	\$63,091	\$189,273
Fishery Biologist	Silver Spring, MD	ZP-4	2	\$89,924	\$179,848
Fishery Biologist	Gloucester, MA	ZP-3	3	\$63,386	\$190,158
Fishery Biologist	Juneau, AK	ZP-3	2	\$63,330	\$126,660
Fishery Biologist	Long Beach, CA	ZP-3	2	\$64,585	\$129,170
Subtotal			<u>35</u>		<u>\$ 2,179,847</u>
2015 Pay Adjustment	1.0%				\$21,798
Total					\$2,201,645
Less Lapse	25%		<u>(9)</u>		<u>(\$550,411)</u>
Total Full-time permanent:			26		\$1,651,234
2016 Pay Adjustment	1.3%				\$21,466
TOTAL			26		\$1,672,700
Personnel Data			Number		
Full-time permanent			26		
Other than full-time permanent			<u>0</u>		
Total			26		
Authorized Positions:					
Full-time permanent			35		
Other than full-time permanent			<u>0</u>		
Total			35		

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: National Marine Fisheries Service
Sub-Program: Protected Resources Science and Management
Program Change: Increase Consultation Capacity

Object Class	FY 2016 Increase	FY 2016 Total Program
11 Personnel compensation		
11.1 Full-time permanent	\$1,673	\$50,063
11.3 Other than full-time permanent	0	1,110
11.5 Other personnel compensation	0	143
11.8 Special personnel services payments	0	210
11.9 Total personnel compensation	1,673	51,526
12 Civilian personnel benefits	510	16,069
13 Benefits for former personnel	0	12
21 Travel and transportation of persons	595	2,910
22 Transportation of things	0	87
23.1 Rental payments to GSA	0	2,203
23.2 Rental Payments to others	0	459
23.3 Communications, utilities and miscellaneous charges	0	1,604
24 Printing and reproduction	26	637
25.1 Advisory and assistance services	8,902	19,014
25.2 Other services	0	183
25.3 Purchases of goods & services from gov't accounts	0	10,260
25.4 Operation and maintenance of facilities	0	0
25.5 Research and development contracts	854	1,679
25.6 Medical care	0	0
25.7 Operation and maintenance of equipment	0	0
25.8 Subsistence and support of persons	0	0
26 Supplies and materials	125	2,395
31 Equipment	185	655
32 Lands and structures	0	0
33 Investments and loans	0	0
41 Grants, subsidies and contributions	360	20,926
42 Insurance claims and indemnities	0	0
43 Interest and dividends	0	0
44 Refunds	0	0
99 Total obligations	13,230	130,619

Marine Mammals, Sea Turtles and Other Species: Species Recovery Grants (Base Funding: \$5,012,000 and 3 FTE; Program Change: + \$17,000,000 and 0 FTE): NOAA requests an increase of \$17,000,000 and 0 FTE for a total of \$22,012,000 and 3 FTE for the conservation and recovery of marine and anadromous species through the Species Recovery Grant Program.

Proposed Actions:

NMFS proposes to expand its level of cooperation with states and tribes in efforts to recover threatened and endangered species by awarding more grants but also by increasing the scale and scope of the grants funded. Awarding more grants will help our partners meet management needs for the growing number of listed species, and awarding larger scale, ecosystem-focused or multi-state and multi-region projects will increase the impact of funded work on the recovery of listed species. Species Recovery Grants, which are awarded to states and tribes under the authority of Section 6 of the ESA and the Fish and Wildlife Coordination Act, will continue to support high priority recovery actions. Such actions can include reducing or removing significant sources of mortality and injury, assessing and monitoring species status and trends, developing conservation plans to minimize and mitigate bycatch of listed species, conserving habitat, and educating and engaging the public in the conservation of ESA-listed species. Grants may also support needed monitoring of candidate and recently de-listed species. Species Recovery Grants are administered in close coordination with the Community Based Restoration Program (CBRP) and the Pacific Coastal Salmon Recovery Fund (PCSRF) to realize efficiencies, identify strategic opportunities, and achieve significant conservation benefits on a national scale.

Statement of Need and Economic Benefits:

As of January 1, 2015, NMFS had jurisdiction over 125 threatened or endangered species. In addition, seven species have been proposed for listing, 27 species are candidates for listing, and an additional four species are the subject of listing petitions currently under review by NMFS. Given the number of species that have been petitioned or are under consideration for listing, more species will likely be added to the list in 2015 and 2016. Given the escalating number of species requiring the protections of the ESA, failing to maintain investment in recovery and delisting will increase the agency's statutory and regulatory responsibilities and lead to increased pressure on protected species programs nationwide (e.g., Section 7 consultations, Section 10 permitting). Similarly, state agencies that share management responsibilities for these species will also require additional support in order to adequately manage the growing number of threatened and endangered species in state waters.

The Species Recovery Grants Program is the primary mechanism for funding and implementing recovery actions for listed species. Recovery actions are those actions needed to recover and delist species. These actions are identified in NMFS Recovery plans, which are developed by expert teams, involve constituent input, and are subjected to public and peer reviews. Proposals selected for Species Recovery Grant funding are those that address high priority recovery actions for listed species.

Two competitive grant programs are administered under the Species Recovery Grant Program—one for states and one for tribes. States and tribes have management authorities and responsibilities for protected species within their jurisdictions, and as such, they are uniquely qualified to partner with NMFS in the implementation of recovery actions for listed species. These partnerships leverage existing state and tribal resources and expertise. Section 6 of the ESA also includes a matching provision that requires states to provide 25 percent of total project costs, or 10 percent of total project costs when two or more states work

together.

The Species Recovery Grant Program supports all types of activities identified in recovery plans—management, monitoring, research and outreach—and funding may be applied to any one of the species under NMFS’ jurisdiction from blue whales to black abalone. Twenty-four states (including U.S. territories), from Guam to Alaska to Puerto Rico, are eligible for this funding. All federally recognized tribes are also eligible. Over \$34.0 million in Federal grant funding has been provided to states, tribes, and approximately 53 other partner organizations to support conservation and recovery of 26 threatened or endangered species since fiscal year 2003, when just under \$1.0 million was first available for grants to states. Examples of funded work to date include Hawaiian monk seal disentanglement and rescue; captive breeding efforts to prevent extinction of white abalone; development of an Atlantic coast sturgeon tagging network and database; and repair of water control structures to allow Atlantic salmon access to historical spawning grounds. Jobs have been created or maintained directly through this funding, and multiple indirect economic benefits are expected as grant dollars are expended to improve populations of listed species, which typically receive significant public interest and attention and often have recreational and commercial value for coastal states, as well as cultural and subsistence value for tribes.

Resource Assessment:

The resources for this activity are described in the Marine Mammal, Sea Turtles, and Other Species narrative.

Schedules and Milestones:

FY 2016 – 2020:

- Solicit and review Species Recovery Grant proposals submitted by states and tribes for conservation and recovery activities
- Develop additional Section 6 agreements with states and territories
- Update the U.S. Fish and Wildlife Service Recovery Online Activity Reporting System and the Species Recovery Grants Tracking Database

Deliverables:

FY 2016 – 2020:

- Implement recovery actions identified in recovery plans to prevent species extinction.
- Complete updates to the Species Recovery Grants Tracking Database

Performance Goals and Measurement Data:

Performance Measure: Number of priority recovery actions being addressed through Species Recovery Grants	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	110	110	110	110	110
Without Increase	25	25	25	25	25	25	25
<p>Description: Funding may support recovery actions for any of the listed species under NMFS jurisdiction, with the exclusion of Pacific salmonids.</p> <p>Note: NMFS has established an online database for use by agency personnel monitoring grant performance to enter successfully completed priority recovery actions. This monitoring and reporting will assist NMFS to more accurately track and evaluate species progress to recovery. In the past an assumption of \$200,000 per priority recovery action has applied and is based on prior year activities.</p>							

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: National Marine Fisheries Service
Sub-program: Protected Resources Science and Management
Program Change: Species Recovery Grants

Object Class		FY 2016 Increase	FY 2016 Total Program²
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$48,388
11.3	Other than full-time permanent	0	1,110
11.5	Other personnel compensation	0	143
11.8	Special personnel services payments	0	210
11.9	Total personnel compensation	0	49,851
12	Civilian personnel benefits	0	15,558
13	Benefits for former personnel	0	12
21	Travel and transportation of persons	0	2,315
22	Transportation of things	0	87
23.1	Rental payments to GSA	0	2,203
23.2	Rental Payments to others	0	459
23.3	Communications, utilities and miscellaneous charges (boats)	0	1,604
24	Printing and reproduction		611
25.1	Advisory and assistance services	0	10,118
25.2	Other services	0	183
25.3	Purchases of goods & services from Gov't accounts	0	10,260
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	825
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	2,270
31	Equipment	0	470
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	17,000	37,566
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	17,000	134,389

² Due to financial system limitations, the object class detail for the Program reflects the Marine Mammals, Sea Turtles and Other Species PPA.

Marine Mammals, Sea Turtles, and Other Species: Prescott Grants (Base Funding: \$3,053,000 and 0 FTE; Program Change: -\$1,909,000 and 0 FTE): NOAA requests a decrease of \$1,909,000 and 0 FTE for a total of \$1,144,000 and 0 FTE for the John H. Prescott Marine Mammal Rescue Assistance Grant program. NOAA will still meet existing requirements pursuant to the Marine Mammal Protection Act (MMPA).

Proposed Actions:

The Prescott Grant Program provides competitive grants to stranding network organizations to rescue, rehabilitate, or investigate sick, injured or distressed live marine mammals and to determine the cause of death or disease in dead marine mammals. With this funding, NOAA anticipates awarding approximately 12 grants in FY 2016. Awards will be based on data from episodic strandings and mortality events from the previous year, as well as status of marine mammal populations. NOAA will also continue to provide coordination support, technical and veterinary assistance, and guidance to the stranding network through the Marine Mammals, Sea Turtles, and Other Species program.

Information collected by stranding network participants is important for fulfilling NOAA's MMPA and Endangered Species Act (ESA) mandates, including compiling the List of Fisheries and Stock Assessment Reports, identifying key recovery activities, as well as in monitoring natural and manmade causes of illness or death in marine mammals around the country. NOAA realizes a significant return on its investment by providing small grants to these organizations, allowing them to leverage this money with larger private funding and in-kind services.

Stranding networks are relied upon by local communities for providing timely and adequate responses when marine mammals wash ashore or are seen injured, ill or trapped along our coasts. The Prescott Grant Program provides funds to stranding network organizations to provide quality care for marine mammals that are stranded, sick, injured, or distressed. Since Prescott grants often provide seed funds for stranding responders, they have a significantly larger impact than just the grants alone. In addition, the Prescott Grant Program requires applicants to provide a minimum of 25 percent non-federal cost match for each project. To date, the stranding network has leveraged over \$15.9 million in non-federal funding from this match requirement.

Resource Assessment:

The resources for the John H. Prescott Marine Mammal Rescue Assistance Grant Program are described in the Marine Mammal, Sea Turtles, and Other Species narrative.

Schedule and Milestones:

FY 2016 – 2020:

- Solicit and review Prescott grant proposals submitted by stranding networks for marine animal stranding activities in FY 2016
- Award approximately 12 grants of up to \$100,000 each for FY 2016

Deliverables:

FY 2016 – 2020:

- Data collection on diseases and causes of strandings
- Detection of unusual mortality events
- Jobs for rescue/response/facility personnel
- Improved health and welfare of marine mammals
- Response to marine mammal strandings through a network of responders

Performance Goals and Measurement Data:

Performance Measure: Respond to known strandings in a timely manner and collect data on diseases, cause of death and injuries	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Decrease	N/A	N/A	10%	10%	10%	10%	10%
Without Decrease	29%	23%	23%	23%	23%	23%	23%
Description: Percentage of stranding network organizations that have Prescott Grants to improve their rapid response and examination of stranded marine mammals. Rapid responses enable a higher probability of decreasing pain and suffering, saving individuals, and determining cause of death, type of disease, and other types of injuries.							

Performance Measure: Rapid first response and further examination in Navy training ranges	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Decrease	N/A	N/A	2/4	2/4	2/4	2/4	2/4
Without Decrease	3/4	3/4	3/4	3/4	3/4	3/4	3/4
Description: The US Navy has four training ranges that have letters of authorization to take or harass marine mammals. Examples of actions that may take/harass marine mammals include high frequency sonar and explosive detonations. This performance measure indicates the number of US Navy training ranges that have at least one stranding network participant funded by the Prescott Grant Program to improve their ability for rapid response and further examination when strandings occur during Navy Training Exercises.							

Performance Measure: Percent detection of Unusual Mortality Events	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Decrease	N/A	N/A	9%	9%	9%	9%	9%
Without Decrease	32%	26%	26%	26%	26%	26%	26%
Description: Percent of the coast with Prescott Grant funded stranding coverage in the contiguous states along the Pacific, Atlantic, and Gulf of Mexico that enables detection of Unusual Mortality Events.							

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Program: National Marine Fisheries Service
Sub-program: Protected Resources Science and Management
Program Change: Prescott Grants Program

Object Class	FY 2016 Increase	FY 2016 Total Program³
11 Personnel compensation		
11.1 Full-time permanent	\$0	\$48,388
11.3 Other than full-time permanent	0	1,110
11.5 Other personnel compensation	0	143
11.8 Special personnel services payments	0	210
11.9 Total personnel compensation	0	49,851
12 Civilian personnel benefits	0	15,558
13 Benefits for former personnel	0	12
21 Travel and transportation of persons	0	2,315
22 Transportation of things	0	87
23.1 Rental payments to GSA	0	2,203
23.2 Rental Payments to others	0	459
23.3 Communications, utilities and miscellaneous charges (boats)	0	1,604
24 Printing and reproduction		611
25.1 Advisory and assistance services	0	10,118
25.2 Other services	0	183
25.3 Purchases of goods & services from Gov't accounts	0	10,260
25.4 Operation and maintenance of facilities	0	0
25.5 Research and development contracts	0	825
25.6 Medical care	0	0
25.7 Operation and maintenance of equipment	0	0
25.8 Subsistence and support of persons	0	0
26 Supplies and materials	0	2,270
31 Equipment	0	470
32 Lands and structures	0	0
33 Investments and loans	0	0
41 Grants, subsidies and contributions	(1,909)	18,657
42 Insurance claims and indemnities	0	0
43 Interest and dividends	0	0
44 Refunds	0	0
99 Total obligations	(1,909)	115,480

³ Due to financial system limitations, the object class detail for the Program reflects the Marine Mammals, Sea Turtles and Other Species PPA.

ESA Salmon: Atlantic and Pacific Salmon (Base Funding: \$67,200,000 and 344 FTE; Program Change: +\$1,301,000 and 0 FTE): NOAA requests an increase of \$1,301,000 and 0 FTE for a total of \$68,501,000 and 344 FTE for Endangered Species Act (ESA) Salmon recovery.

Proposed Actions:

NOAA proposes to increase funding for ESA salmon recovery. Under this proposal, NOAA will enhance support for the Atlantic salmon research and management program within the Maine Department of Marine Resources (DMR) and support the following activities related to Atlantic salmon:

- Investigations to understand and recover diadromous species that co-evolved with Atlantic salmon;
- Design and implement actions to recover the ecosystems upon which Atlantic salmon depend;
- Monitor the Penobscot River and Estuary to detect changes in the ecosystem as a result of mainstem dam removal; and,
- Implement additional fish passage improvement and barrier removal projects in the Gulf of Maine distinct population segment (DPS).

NOAA will also expand Pacific salmon monitoring capabilities and increase our ESA Section 7 consultation capacity on the West Coast to improve our on-time consultation completion rate.

Statement of Need and Economic Benefits:

The Atlantic salmon program is a cooperative effort among NOAA, Maine DMR, Penobscot Indian Nation, and the U.S. Fish and Wildlife Service (USFWS). Each entity has clearly defined, unique and complimentary roles in this integrated effort. The FY 2016 request will stabilize core Atlantic salmon recovery programs including stock assessment, Endangered Species Act (ESA) and North Atlantic Salmon Conservation Organization (NASCO) management, and ocean fishery and telemetry elements. NOAA and its public and private partners invested significantly in Atlantic salmon conservation and recovery, including \$50.0 million to purchase and remove two dams, and build a natural bypass around a third dam, on the Penobscot River.

Conservation and recovery of Pacific salmon encompasses activity in the Columbia River Basin, the Klamath River Basin, California's Central Valley, and numerous other small streams and river reaches. A significant portion of the region's economy is tied to these river and stream reaches, such that any change in the regulatory environment can have an enormous economic impact. California remains one of the most productive agricultural regions in the world and continues to be the number one state in cash farm receipts—the state's 81,700 farms and ranches received a record \$37.5 billion for their output in 2010.⁴ The total operating revenues for the Federal Columbia River Power System was \$3.6 billion in 2014.⁵ In addition, about 30 percent of the capacity of the facilities in the basin are owned and operated by municipally owned utilities and private firms.⁶ An inadequately funded salmon program, which conducts Section 7 consultations, Section 10 permitting, stock assessments, and recovery actions, would significantly impact these economic sectors.

⁴ California Water Plan 2013 (<http://www.waterplan.water.ca.gov/cwpu2013/final/index.cfm>). Volume 1, Chapter 3, pg. 90.

⁵ <http://www.bpa.gov/news/newsroom/Pages/Annual-report-recognizes-progress-in-2014.aspx> and 2014 BPA annual report.

⁶ <http://www.eia.gov/todayinenergy/detail.cfm?id=16891>

Resource Assessment:

NMFS currently conducts stock assessments, measures vital survival rates, conducts interagency Section 7 consultations, issues ESA Section 10 incidental take permits, identifies and implements recovery actions, and leads the U.S. international management efforts for ESA salmon. Additional information on the resources for this activity can be found in the ESA Salmon narrative.

Schedule and Milestones:

FY 2016 – 2020:

- Evaluate fish passage effectiveness studies being conducted by dam owners as a condition of their interim species protection plans and associated biological opinions and conduct modeling to establish performance standards on a watershed basis
- Conduct ESA Section 7 consultations on proposed Federal actions in the estuarine and marine environment and for dams and hatcheries
- Monitor salmon and steelhead populations
- Provide a grant to the state of Maine to conduct Atlantic salmon assessment and management activities including actions to conserve genetic diversity
- Work cooperatively with partners to conduct post dam removal monitoring studies
- Conduct investigations on the status and role of co-evolved diadromous species in order to design and implement actions to recover the ecosystems upon which salmon depend

Deliverables:

FY 2016 – 2020:

- Completion of informal and formal Section 7 consultations on actions in the estuarine and marine environment and dams and hatcheries
- Quantification of individual and cumulative upstream and downstream fish passage survival at hydro dams
- Scientific review of monitoring facilities study plan and results to determine compliance with quantitative fish passage metrics
- Annual Status of Stocks
- Report on pre and post dam removal monitoring in the Penobscot River and Estuary
- Lab reference document establishing and supporting fish passage performance standards

Performance Goals and Measurement Data:

Performance Measure: Number and Percentage of Recovery Actions Ongoing or Completed (Measure 3.4e)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	2119/ 4482 (47.3%)	2172/ 4482 (48.5%)	2227/ 4482 (49.7%)	2282/ 4482 (50.9%)	2332/ 4482 (52.0%)
Without Increase	2013/ 4457 (45.2%)	2070/ 4482 (46.2%)	2119/ 4482 (47.3%)	2165/ 4482 (48.3%)	2213/ 4482 (49.4%)	2259/ 4482 (50.4%)	2302/ 4482 (51.4%)
<p>Description: This measure tracks the progress of ongoing or completed recovery actions (including Priority 1 actions needed to prevent extinction) included in NMFS approved recovery plans for species listed as threatened or endangered under the ESA. Recovery actions are those actions found to be necessary to remove species from listing under the ESA. They are identified, quantified to the extent possible, ranked in importance (in preventing extinction and promoting recovery), and described in species recovery plans. Actions may include items that can be completed in a year or actions that may take many years to complete or that may be ongoing (such as monitoring).</p> <p>Recovery of threatened or endangered species is a gradual process that can take decades; completed recovery actions can show incremental progress made toward recovery.</p>							

Performance Measure: Number of Section 7 formal consultations and authorizations prepared for proposed Federal activities	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	207	207	208	210	210
Without Increase	185	200	200	200	200	200	200
<p>Description: Increased consultations and related authorizations represent incremental improvement in performance by increased capacity and improvement in efficiencies in out years. This measure assumes a base of 200 formal consultations received based on prior year history.</p>							

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: National Marine Fisheries Service
Sub-program: Protected Resources Science and Management
Program Change: ESA Salmon

Object Class	FY 2016 Increase	FY 2016 Total Program
11 Personnel compensation		
11.1 Full-time permanent	\$0	\$40,847
11.3 Other than full-time permanent	0	857
11.5 Other personnel compensation	0	237
11.7 Special personnel services payments	0	0
11.9 Total personnel compensation	0	41,941
12 Civilian personnel benefits	0	12,680
13 Benefits for former personnel	0	14
21 Travel and transportation of persons	0	499
22 Transportation of things	0	190
23.1 Rental payments to GSA	0	2,655
23.2 Rental Payments to others	0	154
23.3 Communications, utilities and miscellaneous charges	0	684
24 Printing and reproduction	0	430
25.1 Advisory and assistance services	0	4,289
25.2 Other services	400	490
25.3 Purchases of goods & services from Gov't accounts	0	578
25.4 Operation and maintenance of facilities	0	0
25.5 Research and development contracts	0	19
25.6 Medical care	0	0
25.7 Operation and maintenance of equipment	0	0
25.8 Subsistence and support of persons	0	0
26 Supplies and materials	50	849
31 Equipment	100	349
32 Lands and structures	0	0
33 Investments and loans	0	0
41 Grants, subsidies and contributions	751	2,680
42 Insurance claims and indemnities	0	0
43 Interest and dividends	0	0
44 Refunds	0	0
99 Total obligations	1,301	68,501

APPROPRIATION ACCOUNT: OPERATIONS, RESEARCH, AND FACILITIES
SUB-PROGRAM: FISHERIES SCIENCE AND MANAGEMENT

The Fisheries Science and Management sub-program encompasses the scientific and management activities NMFS uses to apply an ecosystem-based management approach to the stewardship of living marine resources for the benefit of the Nation.

NMFS, in partnership with the eight Regional Fishery Management Councils and state and Federal partners, manages marine fisheries using the best available science to inform sound management and conservation actions. NMFS actions result in sustainable fisheries harvest (wild) and production (farmed), rebuilding of depleted fish stocks, conservation and restoration of essential fish habitats, and other support for fishing communities. NMFS' science quality assurance activities, combined with a rigorous peer-review program, ensure that management decisions are based on the highest-quality scientific information. This includes species' responses to environmental changes, species interactions, and fishing and other human activities that affect species and their habitat. Social, cultural, and economic behaviors and incentives that influence interactions between humans and marine fisheries are also important components influencing management decisions.

This sub-program supports the regulatory process which involves extensive analysis of alternatives to meet a number of statutory requirements and agency priorities. In addition to the Regional Fishery Management Councils, this sub-program supports key partners, such as the Interstate Marine Fisheries Commissions, those states that manage many of the same fish stocks within state waters, and state aquaculture agencies thereby contributing to the sustainable fishery outcomes for which NMFS is responsible.

Fisheries and Ecosystem Science Programs and Services

The Fisheries and Ecosystem Science Programs and Services budget line supports the necessary science for management to achieve NMFS objectives, including: efficiently prevent and eliminate overfishing, rebuilding overfished stocks, supporting sustainable aquaculture, conserving and restoring habitats, and other research to support fishing communities.

Fisheries Science Activities

These funds support activities and staff conducting the necessary science used for the analysis and decision-making that support ecosystem approaches to fisheries management, fishery management plans and regulatory implementation, and enforcement to ensure compliance with regulations. Major activities include the following:

- *Recreational Fisheries Engagement and Information:* NOAA is currently implementing the Recreational Fisheries Engagement Initiative to establish a strong and trusting relationship with the recreational fishing community by listening to anglers, taking action to address critical issues of concern, following through on commitments, and empowering anglers to be responsible stewards and resource users. This funding also supports the Marine Recreational Information Program's (MRIP) work to improve and expand NMFS' data collection efforts for monitoring recreational fisheries impacts.
- *Marine National Monuments:* Funds are used for science activities to sustainably manage three Marine National Monuments in the Pacific Ocean encompassing nearly 200,000 square miles, the largest marine reserve in the world.
- *Pelagic Fisheries Research:* NOAA collaborates with academic and research

institutions that provide resources and opportunities relevant to NOAA's mission, but generally extend beyond the agency's own capacities for pelagic fisheries research.

- *West Coast Groundfish Management and Research:* The West Coast groundfish program provides the key science support needed for management of more than 80 fish stocks along the coasts of Washington, Oregon, and California.
- *Atlantic Bluefin Tuna Observer Coverage and Monitoring:* These funds support observer coverage of the pelagic longline fishery in the Gulf of Mexico where Atlantic bluefin tuna (ABFT) are incidentally caught, as well as research and monitoring for Bluefin tuna stock assessments.
- *Regional Science and Operations:* These funds are used to support core survey and stock assessment activities in Alaska. These activities include groundfish survey and stock assessment personnel, as well as the groundfish age and growth program, charters for survey vessels, fuel, supplies, and gear. Funds are also used to support implementation of fishery management plans, amendments, and regulations for managing the commercial fisheries in the EEZ off Alaska, and commercial, subsistence, and recreational halibut fisheries in U.S. Convention waters off Alaska, as well as the operational in-season management of fisheries under Federal management.
- *Electronic Monitoring and Electronic Reporting:* This program supports the development and implementation of electronic monitoring and reporting technologies across the country to improve the timeliness, quality, integration, and accessibility of fishery- dependent data.

Economics and Social Science Research

These funds support NMFS economists and social scientists conducting legislatively mandated (e.g., National Environmental Policy Act (NEPA) and MSA) economic and social analysis for almost 300 rulemakings each year. Underpinning these assessments is a broad range of socio-economic data collection, modeling, and research activities and, increasingly, a number of commercial and recreational fisheries decision support tools. The NMFS Economics and Social Sciences Program addresses topics ranging from traditional fishery management issues (e.g., effects of rebuilding programs, catch share programs, aquaculture, and fishery allocation decisions on fishermen and communities) to emerging coastal and marine resource management issues such as ecosystem services trade-offs and valuation, and community resiliency.

Fisheries Oceanography

The ecosystem approach to management relies upon research that integrates biological, socio- economic, environmental, and oceanographic data into predictive models that improve the Nation's forecasting capabilities for resource management. Fisheries Oceanography funds are distributed between two efforts: Fisheries and the Environment (FATE) and Integrated Ecosystem Assessment (IEA). FATE projects analyze the response of living marine resources to environmental change, including the development of ecosystem indicators, construction of new forecasting models, and development of techniques to incorporate ecosystem indicators into stock or ecosystem assessments. The IEA program conducts research and develops products to enhance scientific advice for better managing the Nation's resources and achieving economic and societal objectives. IEAs are a dynamic, iterative, and adaptive process that includes analysis of diverse ecosystem information and evaluation of potential management actions relative to societal goals.

Antarctic Research

The U.S. Antarctic Marine Living Resources Convention Act requires that the Department of Commerce conduct a program of directed scientific research to “achieve the United States goal of effective implementation of the objectives of the Convention [on the Conservation of Antarctic Marine Living Resources].” NOAA’s Antarctic Ecosystem Research Division (AERD) implements the ecosystem research program known as the U.S. Antarctic Marine Living Resources (AMLR) Program. This program is NOAA’s only dedicated, long-term ecological presence in the Antarctic, with observations dating back to 1986. The U.S. AMLR Program conducts ecosystem-based research in support of U.S. policy interests related to Antarctic resource management. Its objective is to understand the relative impacts of fishing, climate change, and other human activities on the Antarctic marine ecosystem and predict the future impacts of proposed management actions.

Climate Regimes & Ecosystem Productivity

The Climate Regimes & Ecosystem Productivity Program (CREP) provides Federal, state, tribal, and private-sector decision-makers with information on how climate variability and change are impacting U.S. marine ecosystems and the communities and economies that depend on them. While CREP was designed to provide information in each region, it is currently operational only in the North Pacific region through the North Pacific Climate Regimes and Ecosystem Productivity project (NPCREP) and the newly implemented distributed biological observatory (DBO). NPCREP provides information, assessments, and projections of climate-related impacts on living marine resources of the Bering Sea and Gulf of Alaska. This area includes some of the Nation's richest commercial fishing grounds – 5.8 billion pounds of seafood were landed in Alaska, totaling 59 percent of U.S. landings, with a value of \$1.9 billion in 2013⁷. The DBO is a change detection array tasked with monitoring biophysical responses along a latitudinal gradient extending from the northern Bering Sea to the northeastern Chukchi Sea. These areas are also home to many protected species and native communities that depend on this productive marine ecosystem. These resources and the communities that depend on them are particularly vulnerable to climate-related impacts given the scale, scope, and pace of climate changes in this region.

Information Analysis and Dissemination

Requirements and directives for data collection, data management, and data dissemination are included in the MSA, Marine Mammal Protection Act (MMPA), Endangered Species Act (ESA), Aquaculture Act of 1980, and Data Quality Act, and in the President’s Open Government Directive for Information Sharing Memorandum "Building a 21st Century Digital Government," Executive Order "Making Open and Machine Readable the New Default for Government Information," and Open Data Policy. In response to these directives, the information analysis and dissemination effort supports NMFS staff who process, analyze, and produce data and disseminate the resulting information to resource managers and other users.

Fisheries Data Collections, Surveys, and Assessments

One of NMFS’ core functions is to provide accurate and timely assessments of fish and shellfish stocks that support commercial and recreational fisheries. Stock assessment models estimate a stock’s status over time and forecast future dynamics to advise fishery managers on the effects of fishing in their development of sustainable harvest levels. The advice provided by assessment models is most reliable when the models incorporate quality

⁷ Fisheries of the United States 2013: <http://www.st.nmfs.noaa.gov/Assets/commercial/fus/fus13/FUS2013.pdf>

data on fishery removals, stock abundance and biology, and, in some cases, ecosystem and environmental variability. Funds support data collection, data management, and fisheries stock assessment production.

Expand Annual Stock Assessments (EASA)

Stock assessments provide the technical basis for fishery management decisions such as setting annual catch limits (ACLs) to achieve optimum yield from the fishery while avoiding overfishing and ecosystem harm. Thus, reliable assessments are necessary for fishery management programs, such as catch shares, to be successful. Assessment activities include major data collection efforts (fishery dependent and independent data), stock assessment model development, and research efforts (advanced sampling technologies, incorporation of ecosystem dynamics into stock assessment models, etc.). In addition, NMFS efforts include progress towards the implementation of a next generation stock assessment framework where stock assessments are conducted following a prioritized portfolio that defines target frequency and assessment levels for each stock. This framework includes assessments linked to climate, ecosystem and habitat dynamics where appropriate, and at least baseline monitoring for all federally managed fish stocks.

Fisheries Statistics

Accurate data and reliable statistics on fishing effort and catch are essential for assessing impacts on fish stocks, as well as for monitoring performance relative to wild fishery management targets and aquaculture objectives. Funds are used to manage and conduct data collection, data processing, statistical analysis, information management, and statistical reporting activities for commercial and recreational fisheries.

Fish Information Networks

The Fish Information Networks program supports several state-Federal cooperative programs that coordinate data collection, data management, and information management activities, which are essential for accurate monitoring of commercial and recreational fishing impacts in each region. These cooperative programs collect data and manage information on fishing participation, fishing effort, and catch. They also help collect fishery-dependent biological data needed for stock assessments. The programs included are: Atlantic States Marine Fisheries Commission, Gulf of Mexico Fisheries Information Network, Alaska Fisheries Information Network, Pacific Fisheries Information Network, Recreational Fisheries Information Network, National Fisheries Information System (cross-regional communication and planning efforts), and the Marine Fisheries Initiative (research and development for the Southeast region).

Survey and Monitoring Projects

These activities support bluefin tuna tagging research, red snapper monitoring and research, West Coast groundfish surveys, Alaska extended jurisdiction programs, Maine and New Hampshire inshore trawl surveys, Chesapeake Bay multispecies surveys and research, Bering Sea pollock research, and Gulf of Maine groundfish assessment, to name a few. These targeted surveys and biological investigations improve the information available to conduct accurate stock assessments and directly contribute to the Percentage of Fish Stocks with Adequate Population Assessments and Forecasts performance measure 3.4b.

American Fisheries Act

These funds support the underlying science necessary for the management activities under

the American Fisheries Act (AFA). Data collected supports management measures that fall into four general categories: 1) regulations that limit access into the fishing and processing sectors of the Bering Sea and Aleutian Islands (BSAI) pollock fishery and that allocate pollock to such sectors; 2) regulations governing the formation and operation of fishery cooperatives in the BSAI pollock fishery; 3) regulations to protect other fisheries from spillover effects from the AFA; and 4) regulations governing catch measurement and monitoring in the BSAI pollock fishery.

Cooperative Research

Cooperative research enables commercial and recreational fishermen to become involved in collecting fundamental fisheries information to support the development and evaluation of management options. Through cooperative research, industry and other stakeholders can partner with NMFS and university scientists in all phases of the research program—planning the survey and statistical design, conducting research, analyzing data, and communicating results.

Marine Resources Monitoring, Assessment, and Prediction Program

The Marine Resources Monitoring, Assessment, and Prediction (MARMAP) Program is a cooperative fisheries project of NMFS and the South Carolina Marine Resources Research Institute (MRRI). For more than 40 years, the MRRI has conducted fishery-independent surveys and related research on groundfish, reef fish, and coastal pelagic fishes within the region between Cape Lookout, North Carolina, and Cape Canaveral, Florida.

Southeast Area Monitoring and Assessment Program (SEAMAP)

Funding for SEAMAP supports the collection of fishery-independent data through state, Federal, and university partnerships. Partnership arrangements are set up through cooperative agreements in three areas: South Atlantic (North Carolina to Florida), Gulf of Mexico (Florida to Texas), and Caribbean (U.S. Virgin Islands and Puerto Rico). SEAMAP coordinates state and Federal surveys for the collection, management, and dissemination of fishery-independent data on marine resources. The data support the sustainable use of commercially and recreationally valuable fish stocks in the southeastern United States.

Observers and Training

The goal of observer programs is to provide accurate and timely information and analyses on the biological, ecological, economic, and social aspects of the Nation's fisheries resources. The authority to place observers on commercial fishing and processing vessels is provided by the MSA, MMPA, and ESA. Fisheries observer programs are a proven, unbiased, and valuable source of information on the Nation's fisheries, and are considered the most reliable and cost-effective means currently available to collect fishery-dependent data.

Since 1972, NMFS has deployed fishery observers to collect catch and bycatch data from U.S. commercial fishing and processing vessels. Observers monitor fishing activities on all U.S. coasts and collect data for a range of conservation and management issues. This includes information on fishing practices, vessel and gear characteristics, fishing locations and times, environmental conditions within the fishing grounds, compliance with fishing regulations, and socio-economic data. Observers also collect biological samples and may assist in fish tagging and tag recovery, or in special data collections for stock assessment programs. The scientific data collected by observer programs are critical inputs for population assessments of threatened and endangered species such as sea turtles, seabirds, and marine mammals, and for effective management of the Nation's fish stocks.

Observer programs are implemented in each of NMFS' five regions. The Office of Science and Technology coordinates observer programs at the national level through the National Observer Program. Observers annually monitor 48 fisheries, including 10 catch share fisheries.

Fisheries Management Programs and Services

Under the authority of the MSA and other fisheries legislation, the Fisheries Management Programs and Services budget line supports management to achieve NMFS objectives, including: efficiently preventing and eliminating overfishing, rebuilding overfished stocks, supporting sustainable aquaculture, conserving and restoring habitats, and other research to support fishing communities.

Fisheries Management Base

These funds support NMFS staff efforts to deliver the following services, including analysis and decision-making to support fisheries management and regulatory implementation:

- National Environmental Policy Act (NEPA) compliance.
- Management requirements in the Bering Sea and Aleutian Islands (BSAI) Pollock fishery under the American Fisheries Act.
- *Reauthorization of the MSA*: NOAA is prepared to provide the support needed to develop and implement provisions of the legislation once it is enacted.
- *Annual Catch Limits (ACLs) and Accountability Measures (AMs), Peer Reviews, and Stipends*: The six NMFS Regions and the Atlantic Highly Migratory Species Division monitor ACLs and AMs, process and analyze catch data, and report annual data for national performance monitoring. Analysis of these data will determine management actions and lead to the development or improvement of ACL management systems. In addition, this activity supports independent and authoritative reviews of fisheries science and recommendations necessary for the management of marine fisheries resources using the best available science, as specified in the MSA.
- *International Requirements of the MSA*: The international requirements of the MSA include participation and leadership for international obligations under the Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean.
- *Illegal, Unreported, and Unregulated (IUU) Fishing*: NMFS publishes a biannual report identifying nations whose vessels are engaging in IUU fishing. The identification of these nations opens the way for continued consultations between the U.S. Government and officials of these nations to take corrective action to stop IUU fishing. NMFS activities include bycatch identification, consultation and certification procedures, and collection of data to support the identification, consultation, and certification actions with nationals engaged in IUU/bycatch activities and governing Regional Fishery Management Organizations. [Note: Enforcement actions required to prosecute and deter IUU fisheries actions are covered in the NMFS Enforcement Sub-program.]
- *Regulatory Streamlining Program*: The Regulatory Streamlining Program (RSP) improves the quality and timeliness of regulatory processes and policy development for its Fishery Management Program. The RSP enables NOAA to efficiently address policy issues with the Regional Fishery Management Councils early in the regulatory process, rather than later when it becomes difficult to comprehensively address a new and possibly contentious issue.
- *Regional Fishery Management Councils Support*: NOAA assists in the development, review, and implementation of Council-proposed actions. NMFS staff

assist the efforts of the Councils by facilitating and expediting Secretarial approval and implementation of Fishery Management Plans and amendments, and preparing analytical documents in support of rulemaking.

National Catch Share Program

“Catch share” is a general term for several fishery management strategies that allocate a specific portion of the total allowable fishery catch to individuals, cooperatives, communities, or other entities. Each recipient of a catch share is directly accountable to cease fishing when its specific quota is reached. The term includes specific programs defined in law, such as limited access privilege (LAP) and individual fishing quota (IFQ) programs. Catch share programs have been used in the United States since 1990 and now include 15 fisheries from Alaska to Florida managed by six different Councils. Funding supports activities and capabilities that support development of catch share programs and implementation and operation of specific existing catch share programs (NE Sectors, Pacific Trawl ITQ, Gulf of Mexico Grouper/Tilefish, and Alaska Halibut Sportfish) and new programs (Gulf of Mexico, the Gulf of Alaska, and Atlantic HMS).

Some or all of the incremental operational costs for the catch share programs that meet the definition of a Limited Access Privilege program under the MSA can be recovered once the catch share program is operational. Agency cost recovery is capped at a maximum of three percent of the ex-vessel value of the fishery.

Reducing Bycatch

Data collected from observers are used to develop new gear technologies that reduce the bycatch and bycatch mortality of non-target species, which can save fishing jobs by preventing fishery closures due to interactions with endangered species or attainment of strict bycatch quotas. This funding supports the Bycatch Reduction Engineering Program competitive grants that support researchers to create innovative gear designs and fishing techniques to minimize bycatch.

Product Quality and Safety

NMFS helps ensure that the Nation’s seafood industry is economically sustainable and complies with food regulations. This is done through support for the National Seafood Inspection Laboratory, which provides an analysis laboratory, data management, regulatory compliance risk analysis, and information transfer expertise to support the Department of Commerce National Seafood Inspection Program. Voluntary services are also part of the program, and include sanitation evaluation, product inspection and certification, auditing of food quality and safety programs, and training. Approximately 30 percent of the seafood industry uses NOAA services, and 20 percent of the seafood consumed in the United States is processed by facilities that are inspected by the Program.

Aquaculture

The NOAA Office of Aquaculture is guided by the Aquaculture Act of 1980 and objectives in the 2011 Department of Commerce and NOAA Aquaculture Policies. This guidance establishes a framework to allow sustainable domestic aquaculture to contribute to the U.S. seafood supply, support job creation in coastal communities, enhance important commercial and recreational fisheries, and help restore species and habitat. The United States is a major consumer of aquaculture products, yet is only a minor producer. The United States imports more than 90 percent of its seafood, of which over half is from foreign-produced aquaculture, while only 6 percent of the seafood Americans consume is

from domestic freshwater and marine aquaculture. NOAA is focusing on addressing the regulatory, technical, and scientific barriers to domestic marine aquaculture development. Management efforts include streamlining permitting (working through the Administration's Office of Science and Technology Policy (OSTP) Interagency Working Group on Aquaculture (IWGA)'s Regulatory Task Force); implementing the National Shellfish Initiative; implementing the Gulf of Mexico Aquaculture Fishery Management Plan; developing new culture techniques and technologies; and scientific research to assess and minimize the environmental impacts of marine aquaculture. The Office of Aquaculture also works to develop external partnerships with the private sector, NGOs, and research institutions to leverage private or university resources in the pursuit of goals of common interest.

Salmon Management Activities

This funding supports research and management activities associated with salmon not listed under the ESA. Funding for the Mitchell Act component supports the operations and maintenance of Columbia River hatcheries through grants and contracts to the states of Washington, Oregon, and Idaho, and to the U.S. Fish and Wildlife Service to mitigate the loss of salmon on the Columbia and Snake Rivers.

The Pacific Salmon Treaty component funds NMFS and the states of Alaska, Washington, Oregon, and Idaho to provide personnel support to the Pacific Salmon Commission's technical committees and conduct a broad range of salmon stock assessment and fishery monitoring programs to produce information required to implement Pacific Salmon Treaty provisions. These programs are carried out in fisheries and rivers located from Southeast Alaska to Oregon, including the Columbia River.

Regional Councils and Fisheries Commissions

NOAA is the sole source of funding for the eight Regional Fishery Management Councils. The Councils were established by the MSA to prepare fishery management plans aimed at preventing and eliminating overfishing and rebuilding overfished stocks for the Nation's fisheries for approval by the Secretary of Commerce. The funding is divided among the eight councils and is used for their operating costs such as staff costs, rent, public meeting costs, council member salaries, and travel. Council members are appointed and consist of members from state governments, industry, and academia. Funding also supports the activities of the Interstate Marine Fisheries Commissions, International Fisheries Commissions, and the Interjurisdictional Fisheries Grants.

Schedule and Milestones:

Fisheries and Ecosystem Science Programs and Services (FY 2016- FY 2020)

- *Economics and Social Science*: Expand implementation of an integrated Bioeconomic Length-structured Angler Simulation Tool (BLAST), the Social Indicator Toolbox, and FishSET—a spatial economics toolbox; assess the economic performance of fisheries; and predict the cost/benefits of stock rebuilding programs
- *Fisheries Oceanography*: Continue to work with resource managers to provide ecosystem-based science information, including Management Strategy Evaluations, to inform management decisions for evolving constituent-defined management issues in the California Current IEA; continue to develop capacity in additional IEA regions
- *Antarctic Research*: Conduct U.S. research surveys to estimate the biomasses of Antarctic krill and fishes, continue annual studies and assessments of krill-dependent

predators to determine the impacts of krill fishing and climate change, and complete or contribute to stock assessments for 26 targeted stocks and provide scientific advice to the U.S. Delegation to the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR)

- *Climate Regimes and Ecosystem Productivity*: Conduct long-term observations of climate-related impacts on the Bering Sea ecosystem using a variety of observation networks and platforms for use in integrated ecosystem assessments and deliver Bering Sea Ecosystem Forecasts to help living marine resource managers incorporate climate-related impacts into management decisions
- *Information Analysis and Dissemination*: Improve population dynamics/ assessment/ management model development and data analysis tools to support fisheries science programs and improve data dissemination and sharing of integrated (climatology, socio-economic, ecosystem, and fishery-dependent and fishery-independent) data and analyses, both internally and externally

Fisheries Data Collections, Surveys, and Assessments (FY 2016–2020)

- *Fisheries Monitoring, Assessment, and Forecasting*: Conduct and expand fishery-independent surveys; develop advanced sampling technologies to enhance data collection for stock assessments; improve timely delivery of fish stock assessments to fishery managers; and further the implementation of the next-generation stock assessment framework
- *Cooperative Research*: Issue awards for cooperative research from the national Cooperative Research Program (CPR), Northeast Research Set- Aside (RSA), and the Southeast CRP competitive grants; and conduct cooperative research surveys nationwide
- *Marine Resources Monitoring, Assessment, and Prediction (MARMAP)*: Perform fishery-independent assessments of reef fish abundance and life history characteristics of economically and ecologically important reef fish species in shelf and upper slope waters from Cape Lookout to Cape Canaveral
- *Southeast Area Monitoring & Assessment Program (SEAMAP)*: conduct summer and fall SEAMAP groundfish surveys in state and Federal waters, conduct spring and fall SEAMAP plankton surveys in state and Federal waters, conduct SEAMAP inshore and offshore longline surveys, and conduct spring and summer reef fish surveys in offshore waters

Observers and Training (FY 2016-FY 2020)

- Provide coverage in 48 fisheries nationwide, with a goal of expanding observer coverage in existing fisheries and implementing new observer programs in fisheries transitioning to catch share management
- Maintain the number of fisheries with adequate or near adequate observer coverage at 31, the number of sea days observed annually at 78,000, and the percentage of fish stocks with adequate population assessments and forecasts
- Provide updated bycatch estimates for the National Bycatch Report
- The National Observer Program (NOP) will continue to coordinate observer program activities at the national level by developing new standards, policies, and procedures to improve observer programs. The NOP will complete the NOP Annual Reports and provide biennial online updates to the National Bycatch Report that was first published in September 2011, an online update was published in 2013 and a second update is scheduled in 2015, with a target publication date of 2017 for the next comprehensive report

Fisheries Management Programs and Services (FY 2016-FY 2020)

- *Illegal, Unreported, and Unregulated (IUU) Fishing*: Address MSA mandates to implement IUU/Bycatch identification, monitoring, certification procedures, and reports to Congress, and engage in technical assistance to improve the capacity of other countries to conserve and manage living marine resources of mutual interest.
- *Reducing Bycatch*: Develop technological solutions and investigate changes in fishing practices designed to minimize bycatch of fish and protected species as well as minimize bycatch injury and mortality
- *Regional Fishery Management Councils Support*: Increase the number of FMPs implementing electronic monitoring and reporting technology applications to enhance data collection programs
- *National Catch Share Program*: Continue to work with interested Regional Fishery Management Councils to develop and implement new catch share programs and advance efforts to explore the use of technology to improve the cost-effectiveness of catch share programs
- *Aquaculture*: Implement regulations for the Gulf of Mexico Fishery Management Plan for Aquaculture and begin permitting of offshore finfish operations in the Gulf of Mexico; and update and report on Science Center research on environmentally sound aquaculture practices (e.g., genetics and disease management, research on sustainable aquaculture feeds)

Salmon Management Activities (FY 2016–2020)

- Support the operations and maintenance of Columbia River hatcheries to mitigate the loss of fish production due to hydropower dams
- Conduct a broad range of salmon stock assessment and fishery monitoring programs in the Snake and Columbia Rivers

Regional Councils and Fisheries Commissions (FY 2016–2020)

- Continue to revise Fishery Management Plans and amendments to prevent overfishing, rebuild overfished fisheries, and promote sustainability
- Complete socioeconomic analyses for fishery management actions
- Work with Councils to implement electronic technologies for fishery monitoring

Deliverables:

Fisheries and Ecosystem Science Programs and Services (FY 2016–2020)

- *Economics and Social Science*: Assessments of the benefits/cost-effectiveness of fisheries rebuilding programs and habitat and protected species recovery programs and decision support tools and improved quantitative models for conducting benefit-cost analyses and predicting how fishery participants will respond to changes in management measures
- *Ecosystem Science*: Updated or new Management Strategy Evaluations (MSEs) delivered to resource managers from the California Current IEA and delivery of environmental indicators and predicted impacts on managed species to appropriate stock assessment scientists and Councils through the FATE program
- *Antarctic Research*: Advice on ecosystem-based management of fisheries that impact krill, finfishes, krill-dependent predators, and other components of the Antarctic ecosystem and stock assessments for 26 targeted stocks of krill, fishes, and

crabs managed by the CCAMLR

- *Climate Regimes and Ecosystem Productivity*: Expanded survey information for five commercial fish stocks and four protected species stocks.
- *Information Analysis and Dissemination*: Support for Integrated Ocean Observing System, NOAA Environmental Data Management Committee, NMFS Enterprise Data Management, NMFS Fisheries Information Systems, NMFS Marine Recreational Information Program, GeoSpatial One Stop, and data.gov requirements for data collection, processing, dissemination, archiving, and data sharing

Fisheries Data Collections, Surveys, and Assessments (FY 2016–2020)

- *Fisheries Monitoring, Assessment, and Forecasting*: Fishery-independent surveys to provide ongoing data for stock assessments; stock assessment reports based on a next-generation stock assessment framework for key stocks; and more precise estimates of recreational catch through improved surveys
- *Cooperative Research*: Individual project final reports of the results and archive all associated data with the Fisheries Science Centers and added to the NMFS InPort Centralized documentation (metadata) repository
- *Marine Resources Monitoring, Assessment, and Prediction (MARMAP)*: Fishery-independent assessments of reef fish abundance and life history survey characteristics of economically and ecologically important reef fish species in shelf and upper slope waters from Cape Lookout to Cape Canaveral; provide resulting data for use in stock assessments and in support of other research and management needs
- *Southeast Area Monitoring & Assessment Program (SEAMAP)*: All SEAMAP surveys in inshore and offshore waters conducted and fishery, habitat, biological and environmental data provided to Regional Fishery Management Councils for incorporation into regional species stock assessments and for development of effective fisheries and habitat management strategies

Observers and Training (FY 2016–2020)

- Data necessary for management of the Nation's fisheries, including information to support management of marine mammals, sea turtles, seabirds, and other protected species
- Information on catch, bycatch, discards, and biological data necessary for in-season monitoring and stock assessments
- Biological information needed for age and growth studies and genetic analyses of threatened or endangered sea turtle populations.
- Information on fishing effort, fishing gear, and specific fishing techniques that minimize bycatch

Fisheries Management Programs and Services (FY 2016–FY 2020)

- *Fisheries Management*:
 - Support for preventing and eliminating overfishing and rebuilding overfished stocks. This is essential to ensuring biological sustainability and to increasing long-term economic and social sustainability of fisheries
 - Development of fisheries regulations and fishery management plans and amendments in order to maintain and restore productive stocks important to commercial, recreational, tribal, and subsistence fisheries
 - Analysis and research to identify, consult, and certify nations whose vessels

engage in IUU fishing and bycatch of Protected Living Marine Resources (PLMR) and recommendations to the Secretary of Commerce, after coordination with other Federal agencies, on possible fishery-product trade prohibitions on nations whose vessels engage in IUU fishing and bycatch of PLMRs

- Improvements in fishing gear and fishing practices that allow fishermen to avoid hitting hard bycatch caps that end fishing seasons early and avoid protected species interactions that can close fishing seasons or entire fisheries
- Implementation of electronic technology applications that complement observer coverage, reduce data entry time and errors, increase the quantity of data available to support fishery management decisions, improve the quality of data available for analysis, and lower the economic and time burden on fishermen for compliance with recordkeeping and reporting regulations
- *National Catch Share Program*: Management of catch share programs as determined by the Councils and Continued assessments of the economic and social impacts of catch share management options and current policies on fishery participants, firms, and communities
- *Aquaculture*: Report on an interagency strategy for establishing a coordinated permitting system for Federal waters; reports on research and development to support environmentally sound aquaculture practices; permits issued for aquaculture operations in the Gulf of Mexico and in other regions in Federal waters; and science-based management tools to support the development of sustainable marine aquaculture

Salmon Management Activities (FY 2016–FY 2020)

- Maintenance of salmon smolt production as required under the Mitchell Act
- Broad range of salmon stock assessment and fishery monitoring programs in the Snake and Columbia Rivers

Regional Councils and Commissions (FY 2016–FY 2020)

- Draft amendments to Fishery Management Plans
- Collect and analyze socioeconomic data on the impacts of fishery management actions

Performance Goals and Measurement Data:
Fisheries and Ecosystem Science Programs and Services

Performance Measure:	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
Number of defined management needs, identified through the Integrated Ecosystem Assessment process, met by Management Strategy Evaluations (cumulative)	6	8	10	12	14	16	18
<p>Description: This measure tracks the annual performance of Integrated Ecosystem Assessments (IEAs) by identifying the number of management needs, as defined by resource managers through the IEA process that are met by a Management Strategy Evaluation (MSE). MSEs are a formal approach using models and forecast scenarios, based on the best available science, to evaluate the benefits and risks (trade-offs) of proposed management actions on ecosystems (including the human component) and to inform management decisions.</p>							

Performance Measure:	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
Number of Antarctic Fish Assessments	26	26	26	26	26	26	26
<p>Description: This measure tracks the 26 stocks of Antarctic krill, finfishes, and crabs in order to quantify the functional relationships between krill, finfishes, their environment and their predators. Total fish assessments will depend on the availability of capable vessels.</p>							

Performance Measure:	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
Number of FMPs with ER implemented to enhance data collection programs	29	29	30	31	31	31	31
<p>Description: This is the cumulative number of Fishery Management Plans (FMP) with Electronic Reporting (ER) systems. Of the total 46 FMPs, currently 29 FMPs have implemented ER (through dealer/processor reporting, vessel reporting, or both). NMFS will work with the Councils and the Highly Migratory Species (HMS) Advisory Panel to identify the appropriate FMPs and increase the number with implemented ER systems each year.</p>							

Performance Measure: Number of FMPs with EM implemented to enhance data collection programs	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	2	3	3	4	4	5	5
Description: This is the cumulative number of Fishery Management Plans (FMP) with Electronic Monitoring (EM) systems. Of the total 46 FMPs, currently two FMPs (three fisheries) have implemented EM. NMFS will work with the Councils and Highly Migratory Species (HMS) Advisory Panel to identify the candidate FMPs and increase the number with implemented EM systems each year.							

Fisheries Data Collections, Surveys, and Assessments

Performance Measure: Original Percentage of Fish Stocks with Adequate Population Assessments and Forecasts (Measure 3.4b)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	59.6% (137/230)	58.3% (134/230)	59.1% (136/230)	60.4% (139/230)	60.4% (139/230)	60.4% (139/230)	60.4% (139/230)
Description: This measure tracks the percentage of the original 230 FSSI fish stocks for which adequate assessments are available to scientifically determine the impact of fishery management actions. To reach this standard, assessments must be based on quantitative information that is sufficient (defined as “Level 3” in the Fisheries Stock Assessment Improvement Plan (SAIP)) to determine current stock status (abundance and mortality relative to established reference levels), is no more than 5 years old, and can forecast stock status under different management scenarios.							

Performance Measure: Revised Percentage of Fish Stocks with Adequate Population Assessments and Forecasts (Measure 3.4b)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	63.8% (127/199)	67.3% (134/199)	68.3% (136/199)	69.3% (138/199)	69.8% (139/199)	70.9% (141/199)	71.4% (142/199)
Description: This measure tracks the percentage of the new 199 FSSI fish stocks for which adequate assessments are available to scientifically determine the impact of fishery management actions. To reach this standard, assessments must be based on quantitative information that is sufficient (defined as “Level 3” in the Fisheries Stock Assessment Improvement Plan (SAIP)) to determine current stock status (abundance and mortality relative to established reference levels), is no more than 5 years old, and can forecast stock status under different management scenarios.							

Performance Measure: Number of Research Projects Conducted Annually (Cooperative Research)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	54	54	54	54	54	54	54
Description: This performance measure projects the number of cooperative research projects conducted annually.							

Observers and Training

Performance Measure: Fisheries with adequate observer coverage	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	29	29	29	29	29	29	29
Description: Total number of fisheries that are observed with adequate observer coverage as defined in the Fishery Management Plan. The number of fisheries with adequate or near adequate observer coverage, as well as the target observer coverage, are dependent on funding, fishing effort, changes in management and/or regulations, and observer program priorities.							

Performance Measure: Number of Sea Days Observed	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	78,000	78,000	78,000	78,000	78,000	78,000	79,000
Description: These values represent the total number of sea days observed. Some sea days are industry-funded; however, they still rely on Federal funding to occur, and thus should be included in performance tracking, as is the case in the NMFS Annual Operating Plan.							

Fisheries Management Programs and Services

Performance Measure: Revised Fish Stock Sustainability Index (Measure 3.4a)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	746.0	749.0	770.5	780.5	788.0	805.5	811.5
Description: The FSSI tracks the status of fish stocks at sustainable levels in relation to fishing mortality and biomass reference points supporting the policy established by Congress in the MSA, that fishing resources be managed so they can produce the maximum sustainable yield. The revised Index includes important domestic U.S. commercial and recreational stocks subject to the MSA requirement to have Annual Catch Limits. It is calculated by assigning a score between 0 and 4 to each stock, then converting the scores to a 1,000-point scale by dividing the sum of all the individual scores by the maximum possible score and then multiplying by 1,000. This revised FSSI was introduced during the FY 2015 phase-in and is being fully utilized in FY 2016.							

Performance Measure: Percent of stocks for which catch did not exceed their specified annual catch limit (ACL)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	78.0%	79.5%	81%	82%	83%	84%	86%
Description: This measure tracks the percentage of stocks that did not exceed their annual catch limit (ACL). Performance is measured by comparing the final annual catch estimate to the ACL for each stock that has an ACL. If the final annual catch estimate for the stock is less than or equal to the ACL, NOAA will report that the stock did not exceed its ACL. The initial model assumes that the percent of stocks managed to their ACLs will increase over time as managers improve their ability to effectively limit catch. The targets for this measure are still under development. The initial data have been exceeding the targets, and hints at the possibility of a stable, rather than an increasing trend. A larger data set is needed before targets are modified but they may be changed in the future.							

Performance Measure: Number of key objectives met by catch share programs	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	16	16	16	16	16	18	18
Description: This measure tracks the number of key objectives met by catch share programs. The key objectives that are tracked for catch share programs implemented in 2010 or later: Increased revenue per vessel (with catch share program)* Increased or full utilization of target species* Decreased bycatch* ACL not exceeded *Changes will be determined by comparing the performance under the catch share program with the average performance prior to implementation of the catch share program.							

Performance Measure: Number of new catch share programs meeting all objectives	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	4	4	4	4	4	4	5
Description: The four key objectives are expected outcomes of implementing catch share programs. By meeting these key objectives, the programs will demonstrate their success in improving the ecological and economic health of that fishery. More detailed information will be reported on a fishery-by-fishery basis when available.							

PROGRAM CHANGES FOR FY 2016:

Fisheries and Ecosystem Science Programs and Services: Electronic Monitoring and Reporting: (Base Funding: \$134,842,000 and 595 FTE; Program Change: + \$5,596,000 and 0 FTE):

NOAA requests an increase of \$5,596,000 and 0 FTE for a total of \$140,438,000 and 595 FTE to support the development, testing, and installation of electronic monitoring and reporting technologies across the country. These electronic solutions will improve the timeliness, quality, integration, and accessibility of fishery-dependent data (e.g., catch and bycatch) for fishery managers, stock assessment scientists, the fishing industry, and other key stakeholders.

Progress to date has been limited due to insufficient funding to address shortcomings identified in the pilot studies and to support implementation of electronic monitoring (EM) and electronic reporting (ER) programs beyond the pilot stage for both catch share and non-catch share fisheries.

Proposed Actions:

ER is used in 29 fisheries throughout the country and EM is used in four Alaska groundfish fisheries (two Fishery Management Plans (FMP)). The results from numerous pilot projects across the country show how and where electronic technologies can effectively support data requirements in the regions. Funding will be used to conduct additional evaluations and install electronic technologies that are proven effective.

Investments will be guided by the Regional Electronic Technologies Implementation Plans for five regions and the Highly Migratory Species (HMS) Division, which were completed in January 2015. The implementation plans include a prioritized list of fisheries⁸ for which EM and/or ER is currently an option (i.e. necessary regulations are in place authorizing paperless reporting or video monitoring), and fisheries for which regulations authorizing EM/ER may not be in place but are considered viable candidates for implementation of EM or ER systems⁹. The plans also include a schedule for implementing EM/ER options in those fisheries.

Annually, at the national level, NMFS will prioritize the list of fisheries identified in the regional implementation plans and based on the project proposals submitted, determine which fisheries will receive funding to implement EM/ER systems. Over time, funding from this request will result in an increase in the number of fisheries and FMPs with implemented EM and ER systems.

Projects will include efforts to develop, test, and install electronic technologies to record and transmit data on fishing vessel operations. Electronic technologies include vessel monitoring systems (VMS), electronic logbooks (ELBs), video cameras for monitoring, and other technologies that provide EM and ER capabilities. VMS enable precise satellite-monitoring of fishing vessel locations in space and time, including course and speed tracking. Video monitoring applications record on-deck harvest and discard operations and have the potential to complement data collected by at-sea observers or record operations on smaller vessels not currently covered by observers. ER applications facilitate accurate and timely reporting of catch and landings data by vessel operators, seafood dealers, seafood processors, and at-sea

⁸ There may be multiple fisheries in a single fishery management plan (FMP). Each fishery in the FMP will be analyzed and considered in terms of its viability and priority for implementation of ER or EM systems.

⁹ There may be some small-scale fisheries for which ER or EM may not be cost-effective or necessary.

observers. Funds would be available to purchase video or electronic reporting equipment, hardware and software, and contract support needed to set up and maintain equipment, and process data from these EM programs.

The amount of funds to be distributed between EM and ER may vary based on agency needs and priorities, as well as the quality and performance of EM/ER projects. Initial efforts focused on the major EM pilot projects currently underway in the Northwest and Alaska. In the Northwest, continued support is needed for the EM pilot program covering multiple segments of the Pacific groundfish fishery, including trawl and fixed gear vessels. In Alaska, the Council is considering the expansion of EM to multiple fleets and fisheries, in particular smaller vessels in the halibut and sablefish fleet. Also, the Atlantic HMS FMP will require EM in the Atlantic Longline fishery beginning in June 2015.

As with other fishery management actions, implementation of EM and ER will likely require changes to fisheries management regulations through the Regional Fishery Management Council process and the HMS Advisory Panel, as well as other relevant state and Federal regulations. A corresponding program change called Management and Regulatory Support for Electronic Technologies (in Fisheries Management Programs and Services, on page NMFS- 65) addresses in more detail proposed actions to meet these management needs.

Statement of Need and Economic Benefit:

Increasing demands for data are driving the need to evaluate and improve existing fishery-dependent data collection programs, in particular with respect to cost-effectiveness, economies of scale, and sharing of electronic technology solutions across regions. NOAA Fisheries recently approved a policy regarding the adoption of electronic technology solutions in fishery-dependent data collection programs. This policy states:

“It is the policy of the National Oceanic & Atmospheric Administration’s (NOAA’s) National Marine Fisheries Service (NOAA Fisheries) to encourage the consideration of electronic technologies to complement and/or improve existing fishery-dependent data collection programs to achieve the most cost-effective and sustainable approach that ensures alignment of management goals, funding sources and regulations.”

Electronic technologies have the potential to increase the quantity of data; lower costs and reduce the time for data entry; improve the quality of data analysis; and lower the economic and time burden on fishermen for compliance with recordkeeping and reporting regulations.

ER systems implemented in recent years have improved the quality of entered data, reduced the time to enter data, enabled the automated entry of sensor data from fishing gear and the vessel, improved processing of data to find and correct errors, provided more timely information for use by fishery managers and fishermen, and reduced duplicative reporting of similar information to multiple agencies. For example, the electronic fish ticket (E-ticket) system implemented in 2011 to support a new catch share program in the Pacific groundfish trawl fishery has allowed almost real time tracking of individual catches. Before E-tickets, it normally took about two to three months to process the paper fish tickets. In-season management of the fishery was based on a combination of paper fish tickets and the Pacific States Marine Fisheries Commission’s aggregation of weekly state port sampler estimates of fleet catch. In 2012, about 2,500 E-tickets were submitted and 96 percent of them were processed within 48 hours. This timely monitoring is essential for reducing the amount of bycatch of these overfished species.

In addition, a variety of different ER tools are being developed and tested to facilitate the

capture and transmission of fishery data collected by shoreside samplers or at-sea observers. The more widespread use of hand-held devices such as data loggers, iPads, and cell/smart phones that are programmed with appropriate data entry and checking software will speed the delivery of high quality data to a central database.

Electronic monitoring and reporting technologies have the capability to improve the agency's data collection efforts. Improved data collection supports more robust assessments and reduces uncertainty in management programs. NOAA will continue to work with the Councils, fishing industry, and other stakeholders to further develop, improve, and implement electronic monitoring and reporting in fishery management plans where it makes the most technical and financial sense.

Resource Assessment:

EM/ER projects have been funded from a variety of budget lines over the years, resulting in short-lived research projects. Gulf shrimp e-logbooks have been funded on a year-to-year basis through Cooperative Research funds, Expand Annual Stock Assessment funds, and a one-time grant award. Other pilot projects have been supported using National Catch Share Program funds. Up to \$3.0 million in FY 2015 will be directed toward EM/ER projects. To ensure that EM/ER projects become operational, the agency will require that project proposals demonstrate how the project would transition from field testing to implementation, including options for cost-sharing with industry, as part of the annual RFP process.

Schedule and Milestones:

FY 2016-2020

- Approve implementation plans for EM and ER and determine which specific fisheries of the 46 FMPs are candidates for implementation of EM/ER
- Further research and develop cost-effective EM applications to support accurate accounting of catch by species and size
- Implement EM and ER options in 80 percent of the fisheries identified as candidate fisheries in the regional implementation plans and the national prioritization process by 2020

Deliverables:

FY 2016-2020

- EM/ER implementation plans, with a prioritized schedule for implementation of EM/ER projects in specific fisheries
- New applications of electronic technologies incorporated into fishery-dependent data collection programs in specific fisheries

Performance Goals and Measurement Data:

Performance Measure: Number of FMPs with implemented ER data collection programs	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	31	32	33	34	35
Without Increase	29	29	30	31	31	31	31
<p>Description: This is the cumulative number of FMPs with ER systems. Of the total 46 FMPs, currently 29 FMPs have implemented ER (through dealer/processor reporting, vessel reporting, or both). NMFS will work with the Councils and Highly Migratory Species Advisory Panel to identify the appropriate FMPs and increase the number of implemented EM/ER programs each year.</p>							

Performance Measure: Number of FMPs with implemented EM data collection programs	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	4	5	6	7	8
Without Increase	2	3	3	4	4	5	5
<p>Description: This is the cumulative number of FMPs with EM systems. Of the total 46 FMPs, currently 2 FMPs (4 fisheries) have implemented EM. NMFS will work with the Councils and Highly Migratory Species Advisory to identify the candidate FMPs and increase the number of implemented EM programs each year.</p>							

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: National Marine Fisheries Service
Sub-program: Fisheries Science and Management
Program Change: Electronic Monitoring and Reporting

Object Class	FY 2016 Increase	FY 2016 Total Program
11 Personnel compensation		
11.1 Full-time permanent	\$0	\$57,294
11.3 Other than full-time permanent	0	1,389
11.5 Other personnel compensation	0	47
11.7 Special personnel services payments	0	0
11.9 Total personnel compensation	0	58,730
12 Civilian personnel benefits	0	17,753
13 Benefits for former personnel	0	30
21 Travel and transportation of persons	40	1,924
22 Transportation of things	0	338
23.1 Rental payments to GSA	0	5,492
23.2 Rental Payments to others	0	1,885
23.3 Communications, utilities and miscellaneous charges	0	4,539
24 Printing and reproduction	0	852
25.1 Advisory and assistance services	0	9,839
25.2 Other services	3,056	6,564
25.3 Purchases of goods & services from Gov't accounts	0	14,341
25.4 Operation and maintenance of facilities	0	0
25.5 Research and development contracts	500	718
25.6 Medical care	0	0
25.7 Operation and maintenance of equipment	0	0
25.8 Subsistence and support of persons	0	0
26 Supplies and materials	0	3,328
31 Equipment	0	932
32 Lands and structures	0	0
33 Investments and loans	0	0
41 Grants, subsidies and contributions	2,000	13,172
42 Insurance claims and indemnities	0	0
43 Interest and dividends	0	1
44 Refunds	0	0
99 Total obligations	5,596	140,438

Fisheries and Ecosystem Science Programs and Services: Ecosystem-based Solutions for Fisheries Management (Base Funding: \$0 and 0 FTE; Program Change: +\$5,000,000 and 0 FTE): NOAA requests an increase of \$5,000,000 and 0 FTE for a total of \$5,000,000 and 0 FTE for the NMFS component of this integrated, cross-disciplinary initiative to better inform decision making with respect to the stewardship and resilience of inshore ecosystems and the living resources and human communities that depend on them. This will be a cross-line office initiative with the NOAA's National Ocean Service (NOS) proposal "Ecosystem-based Solutions for Coastal Resilience" (page NOS-38). NMFS seeks to strengthen coastal community resiliency by better understanding the ecological connections between the fisheries and protected species that occur offshore and the inshore coastal habitats they depend on that are most subject to human disturbance. NMFS will map, characterize, and study coastal ecosystems in order to provide sound scientific information necessary to support NOAA's management of fisheries and protected resources.

Proposed Actions:

NMFS and NOS will collaboratively promote 1) protective coastal infrastructure in the face of inundation risk and inshore habitat loss and 2) sustainable and healthy populations of fish and protected species. Working through the NOAA Habitat Conservation Team, NMFS and NOS will cooperatively select a region or regions to implement this ecosystem science effort. Within the selected region(s) NOAA will develop projects in partnership with local and regional scientists, resource managers, and community decision-makers. The projects will be composed of phased activities in the categories of foundational research and data collection; economic valuation; assessment, modeling and decision support tools; and, for NOS, training, communication, and planning. The integrated execution of these NMFS and NOS initiatives recognizes that coastal ecosystems serve the dual purposes of habitat for managed species and a physical defense for coastal communities (e.g. marshes, dunes, mangroves, etc.). A coordinated approach ensures each region is addressing the overall priority of ecosystem science needs and allows for shared use of data to maximize funding available.

This proposal will provide the scientific underpinning for sound management of fisheries and protected species through the following NMFS activities:

- **Improve Foundational Inshore Science Information:** NMFS will conduct foundational inshore habitat science (e.g. mapping, biological surveying and monitoring, ecological process studies) using advanced technologies, ship-based surveys, ground-truthed satellite imagery, and shore-based observations. This will include critical research on the ecological connections between coastal habitats and offshore ecosystems and living marine resource stocks. Work will also be phased in to determine the economic value of the ecosystem services provided by coastal habitats, focusing on commercial and recreational fisheries and related sectors, such as tourism. The data from these activities will feed into Habitat Assessments.¹⁰

¹⁰ Habitat assessments consolidate, analyze, and report the best available information on habitat characteristics relative to the population dynamics of fishery species and other living marine resources. Tier 1 habitat assessments are based on existing data; Tier 2 habitat assessments require new data and include habitat-specific information on biomass or abundance (<http://www.st.nmfs.noaa.gov/ecosystems/habitat/plans/haip/index>).

- **Develop Habitat Assessments, Predictive Models, and Decision Support Tools for use by Managers:** NMFS will develop Tier 1 (assess habitat associations using existing information) and Tier 2 (upgrade habitat assessments to minimally acceptable level for all life stages) habitat assessments, and develop models that predict offshore species' responses to inshore habitat, oceanographic, and climatic scenarios. This initiative will enable NMFS to develop or augment existing databases and operational, user-friendly portals with up-to-date habitat data and information for use by scientists and managers. Decision support tools will integrate existing and new habitat data as well as modeling results, for landscape/seascape-scale planning and prioritization of habitat protection or restoration.

This initiative supports the Cross-Agency Priority (CAP) Goal for Infrastructure Permitting Modernization. The requested funding will provide the scientific basis necessary to better define Essential Fish Habitat and Critical Habitat and lead to more effective resource management.

Statement of Need and Economic Benefits:

Fisheries managers need a better understanding of nearshore ecosystems and the effects on fishery resources. When management measures employed in a fishery are not effective at recovering a depleted stock, fishery managers seek to determine what else may be influencing the stock's status, such as habitat changes. This proposal will fill information gaps in habitat science and connections to fisheries management.

Approximately 163 million Americans live near the coast and approximately 89 million people vacation on the coasts every year.¹¹ According to a report released in March 2014 by the Census Bureau, the U.S. population in the counties directly along the coast experienced a 39 percent increase in population from 1970 to 2010. The population density at the coast is expected to continue increasing into the future, further intensifying the pressures of development on ecologically and economically important areas. Federal, state, and tribal resource agencies; businesses; and coastal communities urgently need fundamental and up-to-date information on 1) the ecological and economic connections between the fisheries and protected species that occur offshore and the coastal habitats they rely on that are most subject to human disturbance and 2) how these relationships are affected by environmental change. This information is critical to reduce impacts and increase resilience of valuable marine resources and the communities that depend on them. User-friendly decision support tools will also maximize the usage of this new information to implement effective management.

The proposed mapping and advances in habitat science will allow NMFS to quantify the economic benefits of conserving and restoring existing inshore habitats. This information will enable the Agency to include more economic information when prioritizing and justifying future conservation and restoration actions. Support for habitat science has been limited, especially research on the economic and cultural values provided by habitat and the fisheries production that rely on them. However, the value of this work can be seen from several recent projects. The annual value of shrimp production in restored salt marsh habitat

¹¹ NOAA's 2013 State of the Coast Report: National Coastal Population Report, <http://stateofthecoast.noaa.gov/features/coastal-population-report.pdf>; U.S. Commission on Ocean Policy: An Ocean Blueprint, 2004, http://jointoceancommission.org/documents/USCOP_report.pdf

in Galveston Bay, Texas was estimated to range between \$425 and \$690 per hectare.¹² The annual rate of return on the restoration was as high as 5.3 percent, depending on the costs and ecological functions of the specific restoration method. Another example of the economic benefits of habitat science has been demonstrated in a project that mapped the scallop grounds of Browns Bank, Canada to create benthic habitat maps. This effort allowed fishermen to more effectively target scallop habitats by dragging within only 25 percent of their previously fished area, which reduced operational expenses, bycatch, and damage to surrounding habitats.¹³

By better understanding the values of ecosystem services provided by marine habitats and their connections, conservation and restoration resources can be prioritized, essential fish habitat (EFH) and Critical Habitat can be better defined, and appropriate green infrastructure can be incorporated into development. This will lead NOAA and its partners toward more effective resource management, disaster recovery efforts, redevelopment planning, habitat conservation, and restoration of degraded or storm-damaged ecosystems. The research, modeling, and management outputs from this initiative will support NOAA’s stewardship mandates. Improved socio-economic data, maps, monitoring results, and research on inshore habitats (e.g. estuarine nurseries) and their connections to offshore habitats and stocks, will provide information to support resilient coastal economies and populations of living marine resources.

Resource Assessment:

Currently, NOAA has significant in-house expertise and is making modest investments in the habitat science needed to better manage living marine resources and enhance coastal community resilience. Pressure on coastal resources and the increasingly hazardous effects of climate change necessitate the focus of more resources in the area of marine coastal habitat mapping, data collection, and other habitat science activities. Both the NOS and NMFS initiatives will build on existing programs and leverage available efforts to achieve desired outcomes.

Schedule and Milestones:

The proposed actions are organized to support three-year projects that rotate among the NMFS regions.

Milestones	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
Study designs and research plans developed for regions receiving funding, in collaboration with NOS	X	X			X
Multibeam, remote sensing, and field surveys for physical and biological characterization and mapping of coastal habitats		X	X	X	X
Oceanographic and ecological research on physical and ecological connections between coastal habitats and offshore ecosystems		X	X	X	X

¹² Minello TJ, Rozas LP, Caldwell PA, Liese C (2012) A comparison of salt marsh construction costs with the value of exported shrimp production. Wetlands 32: 791-799.

¹³ Taylor PH (2003) Mapping the undersea landscape: Technologically advanced maps of sea floor habitats are becoming vital tools for ocean management. Gulf of Maine Times 7(1) www.gulfofmaine.org/times/spring2003/science_insights.html

Research and surveys to quantify contributions of coastal habitats to regional economies and cultures			X	X	X
Oceanographic, ecological, and socio-economic models and tools			X	X	X
Web-based data availability with model syntheses and tools provided to applied scientists and managers of living marine resources, habitats, and the coastal zone, developed in conjunction with NOS			X	X	X

Deliverables:

- New and updated benthic and water column habitat characterization maps providing current and baseline information for use by fisheries, protected resources, and coastal zone managers
- Information on contributions of coastal habitats to offshore fisheries and protected species production
- Increased habitat valuation information for understanding the economic contributions of coastal habitats to offshore fisheries and protected resources and the coastal communities that depend on them
- Knowledge of anthropogenic and climate change impacts on habitat and species use (e.g. effects of water level changes or other loss of habitat, poleward migration of species) to be used for fisheries and coastal management
- Tier 1 and 2 habitat assessments and models that predict offshore fishery species responses to inshore habitat, oceanographic, and climatic data
- Decision-support tools for use by coastal, fisheries, and protected resource managers using oceanographic, ecological and socio-economic models
- User-friendly, web-based data portals for dissemination of habitat science data and information

Performance Goals & Measurement Data:

Performance Measure: Number of Tier 1 Habitat Assessments	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	2	3	4	4	4
Without Increase	2	2	2	2	2	2	2
Description: Tier 1 habitat assessments use existing information to consolidate, analyze, and report on habitat characteristics relative to the population dynamics of fishery species and other living marine resources. The focus is on habitats related to the 230 stocks of the Fish Stock Sustainability Index.							

Performance Measure: Number of Tier 2 Habitat Assessments	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	0	0	1	2	4
Without Increase	0	0	0	0	0	0	0
Description: Tier 2 habitat assessments are based on new or expanded data collection and research to consolidate, analyze, and report on habitat characteristics relative to the population dynamics of fishery species and other living marine resources. This includes the production of habitat maps; determination of habitat-specific biomass or abundance; consideration of temporal and spatial variability in habitat use; and development of habitat theory and proxies to apply to data-poor stocks. The focus is on habitats related to the 230 stocks of the Fish Stock Sustainability Index.							

Performance Measure: Number of coastal habitats with documented ecological connections to offshore fisheries and ground-truthed models	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	0	0	1	2	3
Without Increase	0	0	0	0	0	0	0
Description: This performance measure addresses the final scientific products of the biological and physical studies and modeling. It provides necessary information on the importance of coastal habitat to offshore fishery resources, and can provide NOAA managers with the ecological information they need to prioritize and justify decisions for conserving and restoring coastal habitats in terms of living marine resource production.							

Performance Measure: Number of coastal habitats with documented valuation of their ecosystem services and ground-truthed models	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	0	0	0	1	2
Without Increase	0	0	0	0	0	0	0
Description: This performance measure addresses is the final scientific product that combines the ecological information with the socio-economic information. It provides necessary information on the socio-economic importance of coastal habitat to NOAA managers, so they can prioritize and justify decisions for conserving and restoring coastal habitats in terms of societal benefits.							

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: National Marine Fisheries Service
Sub-Program: Fisheries Science and Management
Program Change: Ecosystem-based Solutions for Fisheries Management

Object Class	FY 2016 Increase	FY 2016 Total Program ¹⁴
11 Personnel compensation		
11.1 Full-time permanent	\$0	\$57,294
11.3 Other than full-time permanent	0	1,389
11.5 Other personnel compensation	0	47
11.8 Special personnel services payments	0	0
11.9 Total personnel compensation	0	58,730
12 Civilian personnel benefits	0	17,753
13 Benefits for former personnel	0	30
21 Travel and transportation of persons	300	2,184
22 Transportation of things	20	358
23.1 Rental payments to GSA	0	5,492
23.2 Rental Payments to others	0	1,885
23.3 Communications, utilities and miscellaneous charges (boats)	680	5,219
24 Printing and reproduction	0	852
25.1 Advisory and assistance services	500	9,839
25.2 Other services	500	4,008
25.3 Purchases of goods & services from Gov't accounts	0	14,841
25.4 Operation and maintenance of facilities	0	0
25.5 Research and development contracts	1,000	1,218
25.6 Medical care	0	0
25.7 Operation and maintenance of equipment	500	500
25.8 Subsistence and support of persons	0	0
26 Supplies and materials	1,000	3,328
31 Equipment	500	1,932
32 Lands and structures	0	500
33 Investments and loans	0	0
41 Grants, subsidies and contributions	0	11,172
42 Insurance claims and indemnities	0	0
43 Interest and dividends	0	1
44 Refunds	0	0
99 Total obligations	5,000	139,842

¹⁴ Due to financial system limitations, the object class detail for the Program reflects the Fisheries and Ecosystem Science Programs and Services PPA.

Fisheries and Ecosystem Science Programs and Services: Distributed Biological Observatory (Arctic) (Base Funding: \$2,035,000 and 11 FTE; Program Change: +879,000 and 0 FTE): NOAA requests an increase of \$879,000 and 0 FTE for a total of \$2,914,000 and 11 FTE for NMFS Climate Regimes & Ecosystem Productivity to implement a distributed biological observatory to detect climate and human-induced change on Arctic ecosystems.

Proposed Actions:

NOAA requests \$879,000 to implement a distributed biological observatory (DBO) to detect climate and human-induced change on Arctic ecosystems. This effort was initiated through the OAR-led Pacific Arctic Group (PAG), part of the NOAA Arctic Observing Network, and NMFS is continuing support of the Arctic observations to monitor biological response to environmental changes (See OAR Regional Climate Data and Information: NOAA Arctic Research Program: Arctic Observing Network, OAR - 39). The dramatic seasonal retreats and thinning of sea ice, record-setting seawater temperatures and multiple observations of biological changes in the Pacific Arctic require monitoring the ecosystem's response to climate change. The DBO is a change detection array for the identification and consistent monitoring of biophysical responses along a latitudinal gradient extending from the northern Bering Sea to the Barrow Canyon. DBO sampling is focused on transects centered on locations of high productivity, biodiversity, and rates of biological change. A pilot DBO program, begun through the NOAA Arctic Observing Network and accomplished via partnership with other Federal agencies, academia, and international partners, has improved our understanding of how climate and human-induced change are affecting the environment (<http://www.iarpcollaborations.org/teams/Distributed-Biological-Observatory>). The DBO leverages existing interagency investments under the auspices of the recently approved Interagency Arctic Research Policy Committee's five year science plan.¹⁵ The requested funding supports data sampling and analysis, a data workspace and visualization portal, the development of a DBO Data Policy, and data archiving at the Earth Observing Laboratory (EOL).

Statement of Need and Economic Benefits:

Commercial fishing in Alaska, a \$6.7 billion industry, accounts for nearly half the total fish and shellfish catch for the entire United States.¹⁶ In the U.S. Arctic, fishing is currently concentrated in the Bering Sea. The North Pacific Fisheries Management Council has closed the Arctic Management Area in U.S. waters in the Beaufort and Chukchi Seas. Fishing north of the Bering Sea would not be authorized until after NOAA has the scientific data needed to manage the fisheries in order to ensure sustainable harvests. If increasing temperatures and changing ocean conditions shift distribution of some fish species into the Beaufort and Chukchi Seas, this would likely result in greater interest by U.S. commercial fishermen in moving operations north for economic reasons. However, NOAA science to understand the shifts and impacts of climate change and human activity on trust resources is needed before this can happen.

Resource Assessment:

Since 2010, NOAA has provided approximately \$500,000, with additional leveraged funding from BOEM, to test a pilot DBO's value to science and research in the Chukchi and Beaufort Seas. The pilot DBO program has provided baseline information supportive of process-oriented research in a region of rapid climate change. OAR obtains atmospheric, oceanic, and sea ice

¹⁵ <http://www.iarpcollaborations.org/teams/Distributed-Biological-Observatory>

¹⁶ "The Economic Value of the Alaska Seafood Industry." Value inflated for 2014 dollar values. http://www.mcdowellgroup.net/pdf/publications/2013_07_ASMI_Economic_Value_of_the_Alaska_Seafood_Industry.pdf.

observations, conducts research on Arctic climate change, and modeling leading to process-level understanding of Arctic ecosystem status and trends. NMFS Office of Science and Technology and Alaska Fisheries Science Center coordinates national and international DBO activities and delivers scientific analysis necessary for the conservation, management, and utilization of the region's living marine resources.

Schedule and Milestones:

Milestones	FY 2016	FY 2017	FY 2018	FY 2019
Sample DBO stations in 5-8 regions for sustained ecosystem observations in Chukchi and Beaufort Seas	X	X	X	X
DBO Data QA/QC, Visualization, Archive and Integration with International programs	X	X	X	X

Deliverables:

- Sampling in five-to-eight-transects within the station Distributed Biological Observatory, with periodically updated evaluations of variability and change in the context of increased industry activity
- Deliver annual NOAA updates that summarize DBO information for broad distribution in international publications such as NOAA's Arctic Report Card

Performance Goals and Measurement Data:

Performance Measure:	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
Results from DBO sampling reported annually for integration into scientific models/meetings/symposia and to support the work of interagency and NOAA studies							
With Increase	N/A	N/A	5	5	5	5	5
Without Increase	0	0	0	0	0	0	0

Description:

Sampling of the Distributed Biological Observatory (DBO) since its pilot inception in FY 2010 has been focused on two regions. Current annual sampling effort is constrained by funding and the capability to collaborate effectively with international partners. Proposed new effort will coordinate sampling in 5-8 DBO regions and support consistent collaboration with national and international partners as well as annual report outs via NOAA's Arctic Report Card, scientific meeting and public symposia.

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Program: National Marine Fisheries Service
Sub-program: Fisheries Science and Management
Program Change: Distributed Biological Observatory (Arctic)

Object Class		FY 2016 Increase	FY 2016 Total Program¹⁷
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$57,294
11.3	Other than full-time permanent	0	1,389
11.5	Other personnel compensation	0	47
11.7	Special personnel services payments	0	0
11.9	Total personnel compensation	0	58,730
12	Civilian personnel benefits	0	17,753
13	Benefits for former personnel	0	30
21	Travel and transportation of persons	0	1,884
22	Transportation of things	0	338
23.1	Rental payments to GSA	0	5,492
23.2	Rental Payments to others	0	1,885
23.3	Communications, utilities and miscellaneous charges	479	5,018
24	Printing and reproduction	0	852
25.1	Advisory and assistance services	0	9,839
25.2	Other services	0	3,508
25.3	Purchases of goods & services from Gov't accounts	0	14,341
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	218
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	3,328
31	Equipment	0	932
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	400	11,572
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	1
44	Refunds	0	0
99	Total obligations	879	135,721

¹⁷ Due to financial system limitations, the object class detail for the Program reflects the Fisheries and Ecosystem Science Programs and Services PPA.

Fisheries Data Collections, Surveys, and Assessments: Expand Annual Stock Assessments: (Base Funding: \$70,934,000 and 181 FTE; Program Change: +\$2,815,000 and 0 FTE): NOAA requests an increase of \$2,815,000 and 0 FTE for a total of \$73,749,000 and 181 FTE to address critical gaps in its stock assessment program, that will facilitate the implementation of a next generation stock assessment (NGSA) framework, which incorporates ecosystem factors affecting key fish stocks (e.g., climate, habitat) into stock assessments wherever needed and uses advanced technologies to better inform fishery management wherever possible.

Proposed Actions:

NOAA requests an increase of \$2,815,000 to modernize the stock assessment program and to support implementation of a next generation stock assessment (NGSA) framework. NMFS will use the funds to:

- develop and implement advanced sampling technologies (AST) platforms and fill data collection gaps as identified during the past two years of program reviews and the development of both the stock assessment prioritization protocol and Stock Assessment Improvement Plan (SAIP); and
- improve assessment methods and decision tools, build on programmatic infrastructure to implement the prioritization protocol and improve stock assessment throughput.

With the recent completion of national data collection and stock assessment program reviews, conducted over the past two years, and the ongoing development of the prioritization process and new SAIP, NOAA Fisheries now has a clear basis, gap analysis, and plan for modernizing its stock assessment program. Particular focus needs to be given to:

- augmenting data collection activities including multi-disciplinary surveys and operational AST,
- improving assessment modeling, methods and output that are responsive to ecosystem and socioeconomic dynamics,
- increasing data analysis tools and streamlining data management,
- increasing the amount of stock and ecosystem process studies, and
- implementing standard assessment prioritization practices.

The requested funds will address these focus areas in an incremental manner, allowing for further developments of AST and analytical methods alike, both of which are necessary to advance NOAA's stock assessment process. A selection process will also be conducted to determine how funds will be used across regions since some may benefit from the funding more than others depending on priority needs and investment strategy. NOAA is committed to making great strides towards the effective implementation of ecosystem-based approaches to living marine resources, however, and will work towards increasing the efficiency of its activities in order to strengthen its stock assessment enterprise.

Statement of Need and Economic Benefits:

Fish stock assessments provide quantitative information on stock status and the level of removals that can be sustained over the long term. The role of stock assessments has been well-established. National Research Council studies and the Ocean Commission Report all determined that a strong fishery stock assessment program forms the foundation of successful commercial and recreational fishery management. Furthermore, the Magnuson-Stevens Fishery Conservation and Management Act (MSA), which mandated the establishment of Annual Catch Limits (ACLs) in all fisheries by 2011, also required improved assessment capacity. A significant challenge facing fishery managers is that prevention of overfishing

applies to all fish stocks that are broadly distributed across fishing communities everywhere, but large national benefits accrue from a smaller set of stocks that are unequally distributed among communities. Many of the minor stocks among the near 500 federally-managed stocks have never been assessed. In addition, the accumulated knowledge from decades of tracking productivity of fish stocks provides insight into the magnitude of ecosystem and environmental effects and highlights the critical need to improve our ability to include these effects to provide accurate determinations and forecasts.

NOAA is making strides towards reducing assessment uncertainty in the most valuable or sensitive stocks, which allows for smaller buffers when setting ACLs without increasing the risk of overfishing. However, the magnitude of uncertainty that remains in stock assessments is still costing the country millions of dollars in lost revenue and billions of dollars in lost sales. An economic analysis conducted in FY 2014 by the NOAA Fisheries Office of Science and Technology concluded that by just taking a subset of 59 stocks from the FSSI list, lost landings revenue associated with scientific uncertainty is estimated to be as much as \$800.0 million, and that these lost fishing opportunities would have generated 116,000 jobs and \$7.9 billion in sales impact. With NOAA regularly being challenged by stakeholders on the results of their stock assessments and on the data used to calibrate them, it is paramount that NOAA continues to strive to improve the quality of data collected and stock assessments conducted in a timely manner to minimize uncertainty while maximizing the return on investment. As such, we need to right-size the complexity and associated cost for assessments of all stocks, streamline the process, increase throughput and maximize the value of NOAA's stock assessment investment. This requires the completion of the activities proposed in this funding request, without which the country will continue to see millions of dollars in economic loss.

Resource Assessment:

Over the past decades, NOAA Fisheries' fish stock assessments have played a key role in guiding the management of our nation's fisheries towards prevention of overfishing and attaining benefits from coastal resources. Nearly 180 stocks get new or updated assessments each year as we track the stocks' response to fishing and other factors, and attempt to forecast sustainable catch levels that strike the right balance between prevention of overfishing and attainment of full benefits in a constantly changing environment. Assessments that incorporate ecosystem data according to an NGS framework have been completed for 16 fish stocks, including Pacific Coast salmon, Bering Sea/Aleutian Islands flatfishes, and butterfish and herring on the Atlantic Coast. Other regions are exploring ways to incorporate ecosystem data into their stock assessments, where needed, and to set target levels for other stocks according to the prioritized portfolio approach. Additional information on the current resources that support these activities is provided in the Fisheries Data Collections, Surveys, and Assessments narrative.

Schedule and Milestones:

- FY 2016: Implement stock assessment prioritization protocol in all regions;
- FY 2017: Begin strategic implementation of the NGS framework as outlined in the new SAIP;
- FY 2017-2018: expand surveys for target fish for selected areas, operationalize AST in areas that cannot be surveyed using traditional data collection efforts, (e.g. reef fish in the South Atlantic, Caribbean and Gulf of Mexico), and conduct process studies to measure key ecosystem and biological factors affecting targeted fish stocks
- FY 2018: Conduct NGS activities that consider climate and ecosystem forecasts and multispecies interactions, where appropriate

- FY 2019-2020: Deliver stock assessment reports based on the NGSa framework for key stocks and deliver initial stock assessment reports for newly surveyed stocks

Deliverables:

- Improved survey designs using AST to monitor more stocks and cover ecosystem-related shifts in stock distribution
- New and more comprehensive data resulting from surveys and streamlined data management for some key managed fish stocks
- Delivery of stock assessment reports based on an NGSa framework for key stocks

Performance Goals and Measurement Data:

Performance Measure: Number of fish stocks with assessments that consider ecosystem linkages	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	17	18	20	21	21
Without Increase	16	17	17	18	19	19	19
<p>Description: This measure tracks the number of stock assessments that consider ecosystem linkages, including climate, habitat, environment, and food web dynamics. To reach this standard, assessments must reach a “Level 5” as defined in the 2001 Fisheries Stock Assessment Improvement Plan (SAIP). This is a new and cumulative measure that directly evaluates NMFS’ transition to a next generation stock assessment (NGSA) framework. As part of the new SAIP and NGSa framework, assessment levels are being re-evaluated and this measure will be modified accordingly to more accurately report on stocks that are being assessed as part of the NGSa framework.</p>							

Performance Measure: Revised Percentage of Fish Stocks with Adequate Population Assessments and Forecasts (Measure 3.4b)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	68.3% (136/199)	69.8% (139/199)	71.4% (142/199)	71.9% (143/199)	72.9% (145/199)
Without Increase	63.8% (127/199)	67.3% (134/199)	68.3% (136/199)	69.3% (138/199)	69.8% (139/199)	70.9% (141/199)	71.4% (142/199)
<p>Description: This measure tracks the percentage of the new 199 FSSI fish stocks for which adequate assessments are available to scientifically determine the impact of fishery management actions. To reach this standard, assessments must be based on quantitative information that is sufficient (defined as “Level 3” in the 2011 Fisheries Stock Assessment Improvement Plan (SAIP)) to determine current stock status (abundance and mortality relative to established reference levels), is no more than 5 years old, and can forecast stock status under different management scenarios.</p>							

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: National Marine Fisheries Service
Sub-program: Fisheries Science and Management
Program Change: Expand Annual Stock Assessments

Object Class		FY 2016 Increase	FY 2016 Total Program¹⁸
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$50,509
11.3	Other than full-time permanent	0	156
11.5	Other personnel compensation	0	146
11.7	Special personnel services payments	0	750
11.9	Total personnel compensation	0	51,561
12	Civilian personnel benefits	0	16,347
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	1,930
22	Transportation of things	0	439
23.1	Rental payments to GSA	0	2,396
23.2	Rental Payments to others	0	156
23.3	Communications, utilities and miscellaneous charges	800	8,769
24	Printing and reproduction	0	292
25.1	Advisory and assistance services	0	27,848
25.2	Other services	600	762
25.3	Purchases of goods & services from Gov't accounts	0	1,494
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	1,215	1,215
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	6,502
31	Equipment	200	999
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	42,465
42	Insurance claims and indemnities	0	75
43	Interest and dividends	0	1
44	Refunds	0	0
99	Total obligations	2,815	163,251

¹⁸ Due to financial system limitations, the object class detail for the Program reflects the Fisheries Data Collections, Surveys and Assessments PPA.

Observers and Training: Observers and Training (Base Funding: \$44,266,000 and 150 FTE: Program Change: +\$484,000 and 0 FTE: NOAA requests an increase of \$484,000 and 0 FTE for a total of \$44,750,000 and 150 FTE for the Observers and Training program.

The increased funding of \$484,000 will be used to fund approximately 480 sea days of observer coverage in U.S. fisheries in support of the following activities:

- Data necessary for management of the Nation's fisheries, including information necessary to support management of marine mammals and other protected species;
- Information on catch, bycatch, discards, and biological data necessary for in-season monitoring and stock assessments;
- Information to increase compliance with specific regulations;
- Establishment of contracts needed to hire observers through independent observer provider companies;
- Information needed to support other specified science and management programs;
- Biological information needed for age and growth studies and genetic analyses of threatened or endangered sea turtle populations; and
- Information on fishing effort, fishing gear, and specific fishing techniques that minimize bycatch.

The goal of observer programs is to provide accurate and timely information and analyses on the biological, ecological, economic, and social aspects of the Nation's fisheries resources. The scientific data collected by observer programs are critical inputs for population assessments of threatened and endangered species such as sea turtles, seabirds, and marine mammals, and for effective management of the Nation's fish stocks.

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: National Marine Fisheries Service
Sub-program: Fisheries Science and Management
Program Change: Observers and Training

Object Class		FY 2016 Increase	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$14,515
11.3	Other than full-time permanent	0	102
11.5	Other personnel compensation	0	106
11.7	Special personnel services payments	0	64
11.9	Total personnel compensation	0	14,787
12	Civilian personnel benefits	0	4,677
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	472
22	Transportation of things	0	132
23.1	Rental payments to GSA	0	1,446
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and miscellaneous charges	0	710
24	Printing and reproduction	0	186
25.1	Advisory and assistance services	484	17,598
25.2	Other services	0	86
25.3	Purchases of goods & services from Gov't accounts	0	98
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	810
31	Equipment	0	110
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	3,638
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	484	44,750

Fisheries Management Programs and Services: Management and Regulatory Support for Electronic Technologies (Base Funding: \$122,701,000 and 464 FTE; Program Change: +\$1,450,000 and 0 FTE):

NOAA requests an increase of \$1,450,000 and 0 FTE for a total of \$124,151,000 and 464 FTE to develop and implement the regulations, in consultation with the Regional Fishery Management Councils, that will be needed to require use of these technologies. This increase will support six contract staff located in the five NMFS Regions and Headquarters to expedite the use of electronic solutions where appropriate to improve the timeliness, quality, integration, and accessibility of fishery-dependent data for fishery managers, stock assessment scientists, the fishing industry, and other key stakeholders. This work is in conjunction with and directly complements the goals for the NMFS request for Electronic Monitoring (EM) and Reporting (ER) under the Fisheries and Ecosystem Science Programs and Services PPA (page NMFS-44). The goal is to deliver cost-effective and sustainable electronic data collection solutions that enhance monitoring of catch and bycatch in all U.S. fisheries.

Proposed Actions:

With the proposed increase, NMFS will support the development and implementation of regulatory changes needed to increase use of EM/ER across the country. This request strengthens our capabilities to integrate EM/ER into our approach to fishery management so that data collection is more cost-efficient and timely in our Nation's fisheries.

NMFS completed Regional Electronic Technologies Implementation Plans for five regions and the Highly Migratory Species (HMS) Division in January 2015. The implementation plans include a prioritized list of fisheries¹⁹ for which EM and/or ER is currently an option (i.e. necessary regulations are in place authorizing paperless reporting or video monitoring), and fisheries for which regulations authorizing EM/ER may not be in place but are considered viable candidates for implementation of EM or ER systems.²⁰ The plans also include a schedule for implementing EM/ER options in those fisheries.

The Regional Fishery Management Councils (Councils) play an important policy role in the development of the regulations necessitating the collection of data, and in some cases, the regulatory requirements for the use of electronic technologies. While there is a direct linkage between Council management policies and the design of the data systems, the specifics of how management data needs are met are often left to NMFS. In that regard, the requested funding will support staff to coordinate with several key partners in the implementation of electronic technologies including: the Councils, State Marine Fisheries Commissions, states agencies and Tribes. NOAA will work with these partners to identify specific EM/ER goals and objectives for operational data collection programs, evaluate case studies and pilot project results, and develop guidance and best practices for use in the consideration and selection of electronic monitoring options for full implementation, and develop and implement regulations for the use of selected technologies. Additionally, where cost-sharing of monitoring costs between the agency and industry is deemed appropriate and approved under applicable law and regulation, these NMFS staff members will work with Councils and stakeholders to develop plans to transition costs to industry.

Statement of Need and Economic Benefit:

Because the increasing demands for data are driving the need to evaluate and improve existing

¹⁹ There may be multiple fisheries in a single fishery management plan (FMP). Each fishery in the FMP will be analyzed and considered in terms of its viability and priority for implementation of ER or EM systems.

²⁰ There may be some small-scale fisheries for which ER or EM may not be cost-effective or necessary.

fishery-dependent data collection programs, in particular with respect to cost-effectiveness, economies of scale, and sharing of electronic technology solutions across regions, having individuals in each Region to coordinate the interested parties and navigate the regulatory landscape will be invaluable. NOAA Fisheries approved a policy regarding the adoption of electronic technology solutions in fishery-dependent data collection programs. This policy states:

“It is the policy of the National Oceanic & Atmospheric Administration’s (NOAA’s) National Marine Fisheries Service (NOAA Fisheries) to encourage the consideration of electronic technologies to complement and/or improve existing fishery-dependent data collection programs to achieve the most cost-effective and sustainable approach that ensures alignment of management goals, funding sources and regulations.”

Electronic technologies have the potential to increase the quantity of data; lower costs and reduce the time for data entry; improve the quality of data analysis; and lower the economic and time burden on fishermen for compliance with recordkeeping and reporting regulations. In addition, a variety of different ER tools are being developed and tested to facilitate the capture and transmission of fishery data collected by shoreside samplers or at-sea observers. The more widespread use of hand-held devices such as data loggers, iPads, and cell/smart phones that are programmed with appropriate data entry and checking software will speed the delivery of high quality data to a central database.

Electronic monitoring and reporting technologies have the capability to improve the agency’s data collection efforts. Improved data collection supports more robust assessments and reduces uncertainty in management programs. NOAA will continue to work with the Councils, fishing industry, and other stakeholders to further develop, improve, and implement electronic monitoring and reporting in fishery management plans where it makes the most technical and financial sense.

Resource Assessment:

EM/ER projects have been funded from a variety of budget lines over the years, resulting in short-lived research projects. Gulf Shrimp e-logbooks have been funded on a year-to-year basis through Cooperative Research funds, Expand Annual Stock Assessment funds, and a one-time grant award. Other pilot projects have been supported using National Catch Share Program funds. Up to \$3.0 million in FY 2015 will be directed toward EM/ER projects. As NMFS and its stakeholders try to incorporate these changes into the existing regulatory framework, it will be important to have staff included in the Fisheries Management resources.

Schedule and Milestones:

FY 2016-2020

- Approve regional implementation plans for EM and ER and determine which of the 46 FMPs are candidates for implementation of EM/ER
- Further research and develop cost-effective EM applications to support accurate accounting of catch by species and size
- Implement EM and ER options in 80 percent of the fisheries identified as candidate fisheries in the regional implementation plans and the national prioritization process by 2020

Deliverables:

FY 2016-2020

- Regionally based EM/ER implementation plans, with a prioritized schedule for implementation of EM/ER projects
- New applications of electronic technologies incorporated into fishery-dependent data collection programs in specific fisheries

Performance Goals and Measurement Data:

Performance Measure: Number of FMPs with implemented ER data collection programs	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	31	32	33	34	35
Without Increase	29	29	30	31	31	31	31
Description: This is the cumulative number of FMPs with ER systems. Of the total 46 FMPs, currently 29 FMPs have implemented ER (through dealer/processor reporting, vessel reporting, or both). NMFS will work with the Councils and Highly Migratory Species Advisory Panel to identify the appropriate FMPs and increase the number of implemented EM/ER programs each year.							

Performance Measure: Number of FMPs with implemented EM data collection programs	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	4	5	6	7	8
Without Increase	2	3	3	4	4	5	5
Description: This is the cumulative number of FMPs with EM systems. Of the total 46 FMPs, currently 2 FMPs (4 fisheries) have implemented EM. NMFS will work with the Councils and Highly Migratory Species Advisory Panel to identify the candidate FMPs and increase the number of implemented EM programs each year.							

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: National Marine Fisheries Service
Sub-program: Fisheries Science and Management
Program Change: Management and Regulatory Support for Electronic Technologies

Object Class		FY 2016 Increase	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$47,418
11.3	Other than full-time permanent	0	984
11.5	Other personnel compensation	0	52
11.7	Special personnel services payments	0	142
11.9	Total personnel compensation	0	48,596
12	Civilian personnel benefits	0	14,700
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	1,644
22	Transportation of things	0	191
23.1	Rental payments to GSA	0	3,509
23.2	Rental Payments to others	0	624
23.3	Communications, utilities and miscellaneous charges	0	2,303
24	Printing and reproduction	0	689
25.1	Advisory and assistance services	0	9,455
25.2	Other services	1,450	5,807
25.3	Purchases of goods & services from Gov't accounts	0	17,066
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	165
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	2,649
31	Equipment	0	1,824
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	14,929
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	1,450	124,151

Fisheries Management Programs and Services: Teacher at Sea Program (Base Funding: \$122,701,000 and 464 FTE; Program Change: \$0 and 0 FTE): NMFS requests a decrease of \$0 and 0 FTE to terminate the Teacher at Sea Program at NOAA which is part of the Administration's reorganization of STEM education. NOAA will reinvest funding in Fisheries Management activities.

Proposed Actions:

As part of the Administration's comprehensive reorganization of STEM education programs to increase the impact of Federal investments, NOAA proposes to terminate funding for the Teacher at Sea Program. The Teacher at Sea Program provided authentic at-sea research experiences for kindergarten through college-level teachers by partnering them with NOAA scientists and effectively leveraging existing NOAA facilities, resources, research, and scientific platforms, including fisheries vessels, aircraft, and laboratories. NOAA proposes to reinvest funding previously used for Teacher-at-Sea across NOAA Fisheries to continue to achieve NMFS' management objectives, including: efficiently preventing and eliminating overfishing, rebuilding overfished stocks, and supporting sustainable aquaculture.

In 2014, the President's Budget proposed a government-wide STEM reorganization to create a coherent framework for delivering STEM education to more students and more teachers more effectively while reducing fragmentation and the Administration published a Five-Year Federal Strategic Plan on STEM Education to help align the reorganization with key goals and strategies. The areas of priority for this plan include: improving pre-kindergarten-through-grade-twelve (pre-K-12) instruction; increasing and sustaining youth and public engagement with STEM; enhancing undergraduate STEM education; creating a national strategy around graduate fellowships; and better serving groups historically underrepresented in STEM.

Over the past two years, agencies have made considerable progress towards a stronger and more cohesive infrastructure for delivering STEM education. For example, in implementing the Strategic Plan, mission agencies have increased coordination with the lead agencies (the Department of Education, the National Science Foundation, and the Smithsonian Institution) and are identifying ways to leverage existing resources to improve the reach of agency assets.

The 2016 Budget builds on these efforts by proposing a fresh reorganization with targeted adjustments to enable more strategic investment in STEM education with a focus on building and using evidence-based practices and finding new models for leveraging assets and expertise.

Fisheries Management Programs and Services: National Catch Share Program: (Base Funding: \$25,289,000 and 65 FTE; Program Change: +\$2,216,000 and 0 FTE): NOAA requests an increase of \$2,216,000 and 0 FTE for a total of \$27,505,000 and 65 FTE in the National Catch Share Program to develop and implement new catch share programs and strengthen NMFS capabilities to put catch share infrastructure efficiencies in place. These changes will provide an opportunity to improve the economic and ecological quality of certain fisheries and increase accuracy and timeliness of information and analysis on the biological, ecological, and socio-economic aspects of the Nation's fisheries resources.

Proposed Actions:

In FY 2016, NMFS will have 16 programs under catch share management and one pilot program (the Gulf of Mexico headboat pilot program). The requested increase will support activities for development of new catch share programs as well as the implementation and operational efforts, after Council approval. Some activities include program management at the national and regional levels, social and economic data collection or analysis, as well as establishment of catch share accounting databases and reporting systems, program administration, at-sea and dockside monitoring, and science evaluation. While each program is unique with its own set of regional and local economic and ecological issues, there are tools that, if developed on a national level, will eliminate redundancies in programs, encourage more consistent data and data collection practices, and increase efficiencies that will help programs to improve performance. Examples of these tools include the establishment of systems for landings and at-sea discards, improvements to social and economic data collection and analysis, and the establishment of quota accounting systems. The implementation of these systems will reduce the costs to NMFS and industry over time.

Statement of Need and Economic Benefits:

While catch share programs are not new, Congress (in its 2006 amendments to the Magnuson-Stevens Act), as well as national experts have recognized that catch shares are an important management tool that should be available for use in any fishery. In November 2010, NOAA released its Catch Share Policy, which encourages the consideration and adoption of catch share programs. Catch share programs have been used in the United States since 1990 and now include 16 different fisheries from Alaska to Florida managed by six different Councils. Additional fisheries are in the process of considering catch share programs as part of their management plans. Both here and in other countries catch shares have shown they can effectively achieve annual catch limits, reduce the negative biological and economic impacts of the "race for fish", and when properly designed can eliminate overfishing and result in safer and more profitable fisheries while also addressing other social objectives. The long-term economic and ecological benefits of investments in catch share programs have been seen in fisheries that have moved to catch share programs, such as Gulf of Mexico red snapper fishery where the inflation adjusted ex-vessel price has increased by 34 percent and the value of the fishery has more than doubled from \$10.1M in 2007 to \$21.1M in 2013.²¹ The requested increase will improve NMFS abilities to develop and implement catch share programs and support some fisheries in more easily realizing the benefits of catch share management.

Resource Assessment:

"Catch share" is a general term for several fishery management strategies that allocate a specific portion of the total allowable fishery catch to individuals, cooperatives, communities, or other entities. Each recipient of a catch share is directly accountable to cease fishing when its

²¹ 2013 Gulf of Mexico Red Snapper IFQ Annual Report (http://sero.nmfs.noaa.gov/sustainable_fisheries/ifq/documents/pdfs/2013_RS_AnnualReport.pdf), page 25, 28

specific quota is reached. The term includes specific programs defined in law, such as limited access privilege (LAP) and individual fishing quota (IFQ) programs. The funding supports activities and capabilities that support development of catch share programs, as well as the implementation and operations of specific catch share programs—including NE Sectors, Pacific Trawl ITQ, Gulf of Mexico Grouper/Tilefish, Alaska Halibut Sportfish. Additional information on the Catch Share program can be found in the Fisheries Management Programs and Services base narrative.

Schedule and Milestones:

FY 2016 – 2020:

- Work with regional councils to develop new catch share programs
- Work with regional councils to implement new catch share programs
- Observe increased revenue per boat in fisheries with catch share programs incorporating catch share programs
- Observe decreased TAC overages annually in fisheries incorporating catch share programs

Deliverables:

FY 2016 – 2020:

- Implement reporting systems, where appropriate, to reduce costs while maintaining data quality
- Manage catch share programs as determined by Fishery Councils
- Continue assessments of the economic and social impacts of catch share management options and current policies on fishery participants, firms, and communities
- Ensure the continuation of economically and ecologically sustainable fishing communities in a manner consistent with the goals of the MSA and each Council's fishery management plan objectives
- Support implementation of Regional Council-specified royalty collection programs for the initial or any subsequent distribution of allocations consistent with the MSA.
- Although there can be lag time for data reporting and analysis for some of the key catch share objectives, the number of key catch share objectives met should increase from 16 in FY 2014 to 19 in FY 2020

Performance Goals and Measurement Data:

Performance Measure: Number of key objectives met by catch share programs	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	16	16	16	19	19
Without Increase	16	16	16	16	16	16	16

Description: This measure tracks the number of key objectives met by catch share programs. The key objectives that are tracked for catch share programs implemented in 2010 or later:
 Increased revenue per vessel (with catch share program)*
 Increased or full utilization of target species*
 Decreased bycatch*
 ACL not exceeded

*Changes will be determined by comparing the performance under the catch share program with the average performance prior to implementation of the catch share program.

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: National Marine Fisheries Service
Sub-program: Fisheries Science and Management
Program Change: National Catch Share Program

Object Class	FY 2016 Increase	FY 2016 Total Program²²
11 Personnel compensation		
11.1 Full-time permanent	\$0	\$47,418
11.3 Other than full-time permanent	0	984
11.5 Other personnel compensation	0	52
11.7 Special personnel services payments	0	142
11.9 Total personnel compensation	0	48,596
12 Civilian personnel benefits	0	14,700
13 Benefits for former personnel	0	0
21 Travel and transportation of persons	0	1,644
22 Transportation of things	0	191
23.1 Rental payments to GSA	0	3,509
23.2 Rental Payments to others	0	624
23.3 Communications, utilities and miscellaneous charges	0	2,303
24 Printing and reproduction	0	689
25.1 Advisory and assistance services	0	9,455
25.2 Other services	1,716	6,073
25.3 Purchases of goods & services from Gov't accounts	0	17,066
25.4 Operation and maintenance of facilities	0	0
25.5 Research and development contracts	0	165
25.6 Medical care	0	0
25.7 Operation and maintenance of equipment	0	0
25.8 Subsistence and support of persons	0	0
26 Supplies and materials	0	2,649
31 Equipment	500	2,324
32 Lands and structures	0	0
33 Investments and loans	0	0
41 Grants, subsidies and contributions	0	14,929
42 Insurance claims and indemnities	0	0
43 Interest and dividends	0	0
44 Refunds	0	0
99 Total obligations	2,216	124,917

²² Due to financial system limitations, the object class detail for the Program reflects the Fisheries Management Programs and Services PPA.

Fisheries Management Programs and Services: Support for Domestic Seafood Production and Jobs through Aquaculture (Base Funding \$5,825,000 and 20 FTE):

Program Change: +\$2,000,000 and 0 FTE): NOAA requests an increase of \$2,000,000 and 0 FTE for a total of \$7,825,000 and 20 FTE to conduct research and regulatory activities that support sustainable aquaculture development. This proposal will increase the U.S. seafood supply and will create jobs and increase trade opportunities by helping to develop a robust and sustainable U.S. marine aquaculture industry.

This initiative dovetails with an Office of Oceanic and Atmospheric Research (OAR) FY 2016 initiative, reflecting a collaborative approach within NOAA for marine aquaculture research and management. While NMFS science centers focus on cutting edge basic research and developing “tools for rules” to support efficient management, OAR focuses on supporting sustainable industry development. This collaboration has been highly effective and leverages external resources (including a matching requirement within the OAR grant program) and the ability of NMFS to capitalize on partnerships across regional science centers. Furthermore, it fosters a “One NOAA” approach when working with other Federal agencies, states, industry, and NGO partners.

Proposed Actions:

Domestic aquaculture provides an alternative source of livelihood for coastal communities including fishermen, and year-round commerce in coastal regions that have limited economic opportunities. As a complement to wild harvest fisheries, aquaculture can help meet the growing demand for seafood, and serve as a management tool to help rebuild wild stocks.

NMFS requests \$2.0 million to:

- (1) Conduct research at NMFS Fisheries Science Centers to develop science-based “tools for rules” that inform management and ensure the efficient review of aquaculture permit applications. Specific activities include:
 - Modeling to assess and avoid impacts of commercial operations on sensitive habitats and protected species, inform site selection of new aquaculture operations, predict genetic impacts on wild fish populations, and minimize disease.
 - Collaborating with partners on pilot-projects to validate and test technologies and management approaches to ensure readiness for commercial applications.

- (2) Increase regulatory capacity and efficiency for permitting marine aquaculture by:
 - Developing and implementing permitting programs for offshore waters (e.g., Gulf of Mexico).
 - Working with states and Federal partners to streamline permitting in coastal waters (e.g. improving the permitting process for shellfish aquaculture under national and state shellfish initiatives).
 - Developing regional assessments to predict and avoid potential impacts (e.g., to marine mammals) to streamline assessment of individual projects.

The requested funding to support the growth of U.S.-sourced seafood will allow NMFS to develop, test, and transfer the results of aquaculture research to the seafood industry in a manner that benefits the Nation’s economy and creates new jobs.

Statement of Need and Economic Benefits:

Domestic marine aquaculture is poised to emerge as a significant provider of seafood and coastal jobs over the next several years. The U.S. currently imports over 90 percent of its seafood (by value), over half of which is a product of aquaculture.²³ While other countries have successfully supported aquaculture development, production in the US has lagged behind resulting in a greater reliance on imported seafood. The issue of seafood supply and security is becoming an increasingly high priority for seafood and food service companies as seafood prices have spiked to record high levels due to increasing global demand (especially in Asia). As a result, industry leaders are calling for more government support of domestic aquaculture. Concurrently, offshore aquaculture operations are set to come online for the first time, raising novel management considerations. NOAA needs additional resources to manage and foster the sustainable development of the industry consistent with objectives described in the NOAA and DOC 2011 Aquaculture Policies.

Without the aquaculture increases requested for OAR and NMFS, there is a significant risk that aquaculture companies will continue to avoid investing in the U.S. in favor of other nations, such as Panama and Mexico, that have recognized aquaculture's contribution to the seafood supply of coastal economies and have encouraged investment through efficient permitting and partnering on research and development. Despite having the largest EEZ in the world, the U.S. currently ranks 15th globally in aquaculture production, behind smaller countries.²⁴

Resource Assessment:

The resources for this activity are described in the Fisheries Management Programs and Services narrative.

Schedule and Milestones:**FY 2016-2020:**

- "Tools for rules" developed, tested, and utilized in regulatory and management applications for the aquaculture sector
- Streamline regulation and permitting for aquaculture in coastal and offshore waters, especially for shellfish farms
- Implement the Gulf of Mexico Fishery Management Plan for Aquaculture
- Continue implementing the NOAA Aquaculture Policy and DOC Aquaculture Policy and expand National Shellfish Initiative
- Develop programmatic NEPA and other documents to streamline review of individual permits

Deliverables**FY 2016-2020:**

- Create jobs, mainly in coastal communities, by 2020²⁵

²³ Fisheries of the United States 2013, http://www.st.nmfs.noaa.gov/Assets/commercial/fus/fus13/01_front2013.pdf

²⁴ 2012 United Nations Food and Agriculture Organization report on The State of World Fisheries and Aquaculture:

<http://www.fao.org/fishery/sofia/en>

²⁵ Estimates of job creation potential for aquaculture have been estimated in Knapp, Gunnar, "Salmon Farming Employment," Oct 2013 (in preparation) and Knapp, Gunnar, "Potential Impacts of U.S. Offshore Aquaculture In Offshore Aquaculture in the United States: Economic Considerations Implications and Opportunities," 2008. NOAA Aquaculture Program. page 172. Application of estimates from these studies show that at full implementation of the Gulf of Mexico FMP for Aquaculture alone (production at MSY of 64 million pounds annually) would likely create between 1500 and 3000 direct and indirect jobs, with the potential for as many as 15,000 direct and indirect jobs.

- An efficient and coordinated interagency system for Federal permitting for marine aquaculture operations, reducing review times from years to months
- A suite of science-based “tools for rules” to support development of sustainable marine aquaculture (e.g., tools to avoid protected resource interactions, benthic impacts, interaction with wild stocks, etc.)
- Increased number of grants to external partners supporting industry development

Performance Goals and Measurement Data:

Performance Measure: Number of sites permitted for marine aquaculture (offshore)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	5	7	9	11	14
Without Increase	2	3	4	6	7	8	8
Description: Estimates based on Southeast Region projections and personal communication with Regional Coordinators. Numbers are cumulative.							

PROGRAM CHANGE DETAIL BY OBJECT CLASS

(Dollar amounts in thousands)

Budget Program: National Marine Fisheries Service
Sub-Program: Fisheries Science and Management
Program Change: Support for Domestic Seafood Production and Jobs through Aquaculture

Object Class		FY 2016 Increase	FY 2016 Total Program²⁶
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$47,418
11.3	Other than full-time permanent	0	984
11.5	Other personnel compensation	0	52
11.7	Special personnel services payments	0	142
11.9	Total personnel compensation	0	48,596
12	Civilian personnel benefits	0	14,700
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	1,644
22	Transportation of things	0	191
23.1	Rental payments to GSA	0	3,509
23.2	Rental Payments to others	0	624
23.3	Communications, utilities and miscellaneous charges	0	2,303
24	Printing and reproduction	0	689
25.1	Advisory and assistance services	0	9,455
25.2	Other services	1,000	5,357
25.3	Purchases of goods & services from Gov't accounts	0	17,066
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	165
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	500	3,149
31	Equipment	500	2,324
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	14,929
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	2,000	124,701

²⁶ Due to financial system limitations, the object class detail for the Program reflects the Fisheries Management Programs and Services PPA.

Salmon Management Activities: Salmon Management Activities (Base Funding: \$30,358,000 and 27 FTE; Program Change: -\$2,896,000 and 0 FTE): NOAA requests a decrease of \$2,896,000 and 0 FTE for a total of \$27,462,000 and 27 FTE to Salmon Management Activities.

Proposed Actions

At the requested level, NOAA will fund Mitchell Act hatcheries at \$15.9 million and continue to support reform to bring the programs into compliance and consistency with the Endangered Species Act. NMFS will continue to meet its obligations under the Mitchell Act to support the operations and maintenance of Columbia River hatcheries. The hatcheries mitigate the loss of fish production due to hydroelectric dams. NMFS will also conduct a broad range of salmon stock assessment and fishery monitoring programs in the Snake and Columbia Rivers.

The requested level for Salmon Management Activities will fund the Pacific Salmon Treaty implementation at \$11.0 million. This amount is sufficient to meet our obligations under the treaty providing personnel support to the Pacific Salmon Commission's technical committees and conducting a broad range of salmon stock assessment and fishery monitoring programs to produce information required to implement Pacific Salmon Treaty provisions. In addition, the requested amount includes \$0.5 million for Chinook salmon management and Chinook salmon research at Auke Bay.

Statement of Need and Economic Benefits

Projects funded under the Salmon Management Activities line are conducted for the conservation, development, and enhancement of salmon. This funding supports research and management activities associated with salmon composed of three main activities: the Mitchell Act–Columbia River hatcheries, Pacific Salmon Treaty, and Chinook salmon research and management. The Mitchell Act component supports the operations and maintenance of Columbia River hatcheries and construction of fish passage facilities to mitigate the loss of fish production due to hydropower dams.

Resource Assessment:

The resources for this activity are described in the Fisheries Science and Management: Salmon Management Activities narrative.

Schedule and Milestones:

FY 2016-2020:

- Support the operations and maintenance of Columbia River hatcheries to mitigate the loss of fish production due to hydropower dams
- Conduct a broad range of salmon stock assessment and fishery monitoring programs in the Snake and Columbia Rivers

Deliverables:

FY 2016-2020:

- Maintenance of smolt production as required under the Mitchell Act
- Broad range of salmon stock assessment and fishery monitoring programs in the Snake and Columbia Rivers

Performance Goals and Measurement Data:

Performance Measure: Number of salmon smolt produced by Mitchell Act hatcheries (in millions)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Decrease	N/A	N/A	65.8	65.8	65.8	65.8	65.8
Without Decrease	70	70	70	70	70	70	70
Description: This performance measure projects the number of salmon smolt produced by the Columbia River hatcheries.							

PROGRAM CHANGE DETAIL BY OBJECT CLASS

(Dollar amounts in thousands)

Budget Program: National Marine Fisheries Service
Sub-program: Fisheries Science and Management
Program Change: Salmon Management Activities

Object Class		FY 2016 Decrease	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$2,407
11.3	Other than full-time permanent	0	45
11.5	Other personnel compensation	0	0
11.7	Special personnel services payments	0	84
11.9	Total personnel compensation	0	2,537
12	Civilian personnel benefits	0	735
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	0
22	Transportation of things	0	3
23.1	Rental payments to GSA	0	33
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and miscellaneous charges	0	200
24	Printing and reproduction	0	11
25.1	Advisory and assistance services	0	67
25.2	Other services	0	102
25.3	Purchases of goods & services from Gov't accounts	0	3,246
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	120
31	Equipment	0	3
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	(2,896)	20,404
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	(2,896)	27,462

APPROPRIATION ACCOUNT: OPERATIONS, RESEARCH, AND FACILITIES SUB-PROGRAM: ENFORCEMENT

NOAA's Office of Law Enforcement (OLE) is the only conservation enforcement program (Federal or state) exclusively dedicated to Federal fisheries and marine resource enforcement. OLE enforces NOAA's natural resource protection laws and improves compliance with Federal regulations to conserve and protect our Nation's living marine resources and their natural habitat. OLE's jurisdiction spans more than 3 million square miles of ocean, more than 95,000 miles of U.S. coastline, 13 National Marine Sanctuaries, and four Marine National Monuments. OLE is responsible for carrying out more than 35 Federal statutes and international agreements related to living marine resources with primary mandates contained in the MSA, Marine Mammal Protection Act (MMPA), Endangered Species Act (ESA), National Marine Sanctuaries Act, and Lacey Act. OLE provides direct support for enforcement activities in the NMFS Regional Offices, NMFS headquarters' Office of Sustainable Fisheries and Office of Protected Resources, and the National Ocean Service's (NOS) Office of National Marine Sanctuaries.

OLE further leverages the strength of collaboration through the operation of Joint Enforcement Agreements with 27 coastal states and territories, and partnerships with other Federal agencies such as the U.S. Coast Guard. OLE enforcement cases that document violations are referred to NOAA's Office of General Council or the U.S. Department of Justice for review and potential prosecution under their jurisdiction.

NOAA's mandate to end overfishing could not be realized without OLE's efforts to ensure that the millions of people who enjoy and rely on these resources understand and comply with the regulations necessary to ensure sustainable resources for future generations. OLE supports two objectives: (1) enforce laws and regulations that govern commercial fisheries, international and interstate commerce in marine resources, and human interactions with marine mammals and threatened and endangered species; and (2) protect resources within designated sanctuaries, marine monuments, and protected areas. To address these mission requirements, OLE implements four primary methods: (1) traditional enforcement such as investigations and patrols, (2) partnerships with state and Federal agencies, (3) technological tools such as Vessel Monitoring Systems, and (3) outreach and education strategies designed to enhance voluntary compliance with environmental laws and regulations. OLE's goal is to increase this compliance.

Enforcement and Surveillance:

The purpose of most enforcement programs is to ensure effective compliance with laws so their intent is met. In NOAA's case, this means ensuring compliance with a number of laws designed to protect such natural resources as fisheries, ocean ecosystems, sanctuaries, threatened and endangered species, and marine mammals through enforcement tools designed to encourage people to meet their legal obligations. NOAA's special agents and enforcement officers work to deter, detect, investigate, and document any violations of Federal laws and regulations. NOAA's approach to fisheries enforcement emphasizes compliance assistance and increases contacts through monitoring and inspections to assist regulated parties in understanding and complying with fishery regulations. NOAA's compliance assistance program continues to expand as new Enforcement Officers are hired around the country. These Enforcement Officers increase NOAA's participation in community meetings and trade shows, and provide on-the-dock informational visits. Through these efforts, NOAA works to increase public awareness of enforcement goals and ensure objectives are understood and, to the extent possible, supported by the stakeholders.

Interpersonal interactions with Enforcement Officers and the community have proven effective in maintaining dialog on often complex regulations, and allows NOAA's investigative efforts and subsequent prosecution to focus on cases that go beyond misunderstandings and/or clerical errors. This program responds to and works to resolve internal and external inquiries and requests for assistance from a variety of industry and public stakeholders, covering a broad range of issues related to fisheries and marine mammals. The capabilities associated with deterring violations and investigating egregious cases are maintained as critical elements in NOAA's enforcement approach. Most commercial and recreational fishermen comply with conservation measures, and OLE's role is to ensure fair competition and a level playing field.

Cooperative Agreements with States:

The Cooperative Enforcement Program leverages the resources of coastal state and U.S. territorial marine conservation law enforcement agencies in direct support of the Federal enforcement mission. Through the execution of Joint Enforcement Agreements, these partners are primarily involved in Federal enforcement efforts near shore and at sea, as well as land-based monitoring and inspection activities. Since 2001, OLE has capitalized on this approach as a way to address challenges associated with the geographic jurisdiction, breadth of laws and regulations within NOAA's stewardship responsibilities, amount of regulated commercial activity (fishing and both domestic and international trade), and amount of recreational use of the marine environment. This cooperative program allows OLE to concentrate on the investigation and resolution of more serious violations by integrating monitoring and inspection activities for Federal requirements with the work of state/territorial enforcement partners and the U.S. Coast Guard. In FY 2013, these partnerships directly provided 232,378 hours of labor, increasing the number of hours dedicated to Federal marine conservation activities by ten times compared to what NOAA could have accomplished alone.

Vessel Monitoring System:

The Vessel Monitoring System (VMS) is a satellite-based technology program for remote monitoring of fishing vessels at sea. The program supports a growing number of regulations requiring vessels to report in the VMS, and it allows OLE to monitor compliance and track violators over vast expanses. The VMS data serve as valuable evidence and are vital to NMFS' scientific community and fisheries managers. This satellite-based communications system remotely reports vessel positions and provides an infrastructure for the communication of electronic monitoring data. Efficiencies realized by this electronic monitoring method and the data it produces are a significant advance in NOAA's at-sea monitoring efforts. VMS is a cost-effective way to help enforce protected areas, fishing quotas, actual landings, and several Federal natural resources, environmental, and species conservation laws. Prior to VMS implementation, the only methods used to police protected areas were surface and air patrols. These methods are costly and do not provide the round-the-clock coverage provided by VMS.

Implementation of the High Seas Driftnet Fisheries Enforcement Act:

The High Seas Driftnet Fisheries Enforcement Act sets forth U.S. policy to enforce the United Nations' worldwide moratorium on large-scale driftnet fishing beyond the exclusive economic zone of any nation. Renegade large-scale high seas driftnet fishing indiscriminately kills massive amounts of fish and other marine life such as whales and turtles by means of enormous nets suspended for miles in open water. The practice is universally condemned because it is a significant threat to ocean ecosystems and to the food and economic security of nations that rely on fishery resources. The Act provides for denial of port privileges to and import sanctions against nations whose vessels and/or nationals are determined to be conducting illegal driftnet activities and who do not take corrective action. The implementation

of the Act requires a high level of coordination across multiple agencies including NOAA, the U.S. Coast Guard, and the Department of State as well as international partners to continue to combat illegal, unreported, and unregulated (IUU) fishing activities and to achieve the sustainable management of all living marine resources. OLE conducts investigation and enforcement efforts required to prosecute and deter these IUU fisheries actions. Additionally, NOAA conducts some scientific research that provides information on ecosystem indicators in order to reduce uncertainty in population assessments for driftnet affected species and to inform fishery management and enforcement.

Schedule and Milestones:

OLE measures outputs in terms of incidents (documentation of possible violations) initiated, man-hours of monitoring and inspection work, and man-hours of outreach to the regulated public. OLE work performance has fluctuated based primarily on staffing levels with a general increasing trend in outputs.

During FY 2016, OLE plans to:

- Continue to execute the Workforce Analysis and Staffing Plan
- Continue to advance activities in support of NOAA’s Office of Law Enforcement Operational Priorities

Deliverables:

FY 2016–2020

- Execute 27 Joint Enforcement Agreements annually with the Cooperative Enforcement Program’s state and U.S. territory partners
- Monitor approximately 4,450 vessels under the VMS requirements of 23 fisheries management plans, two international convention areas, and the Papahānaumokuākea National Monument
- Review progress toward and determine next set of strategic 5-year national and regional Operational Enforcement Priorities

Performance Goals and Measurement Data:

Enforcement

Performance Measure:	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
Investigations	3,695	2,520	2,250	2,250	2,250	2,250	2,250
Description: Total number of investigations conducted.							

Performance Measure:	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
Man hours of monitoring and inspections	28,394	27,900	30,450	30,450	30,450	30,450	30,450
Description: Total number of hours spent on inspections and monitoring.							

Performance Measure: Man hours of outreach	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	13,944	15,550	15,600	15,600	15,600	15,600	15,600
Description: Total number of hours spent on outreach.							

PROGRAM CHANGES FOR FY 2016:

Enforcement: Improving NOAA's Fisheries Enforcement & Compliance Assistance Capabilities (Base Funding: \$66,168,000 and 217 FTEs; Program Change: +\$850,000 and 0 FTE):

NOAA requests an increase of \$850,000 and 0 FTE for a total of \$67,018,000 and 217 FTEs in the Enforcement Program to strengthen the enforcement and compliance assistance capability of NOAA Fisheries Office of Law Enforcement (OLE) for improved compliance with regulations (i.e. the Vessel Monitoring System, and Marine Forensics Case Support).

Proposed Actions:

NOAA requests \$850,000 to increase the Enforcement Program's ability to support key enforcement and compliance assistance operations in order to:

- Support the NOAA Fisheries Marine Forensic program investigations of potential fraudulent mislabeling and/or protected and endangered marine species violations [\$390,000];
- Offer proactive and real-time compliance assistance to help industry and partners understand and comply with expanding Vessel Monitoring System (VMS) regulations [\$460,000].

The funding will support necessary operational costs for marine forensic analyses used to aide investigations involving potential mislabeling fraud and protected and endangered marine species violations. Additionally, as VMC regulations continue to expand to cover new fisheries or existing requirements in regulation change, funding will support additional staff efforts to provide proactive outreach and education to communities and businesses to enhance voluntary compliance with expanding VMS regulations.

Statement of Need and Economic Benefits:

In 2013, Americans consumed 4.6 billion pounds of seafood and spent an estimated \$86.5 billion for fishery products. By producing and marketing a variety of fishery products for domestic and foreign markets, the commercial marine fishing industry added \$43.6 billion to the U.S. Gross National Product.²⁷ Seafood fraud often involves mislabeling less expensive fish as something pricier, or smuggling contaminated or illegally caught seafood into the country. Such crimes cost consumers money, endanger the public health, and undercut the business of law-abiding fishermen.

Fair and effective law enforcement is critical to sustaining the multi-billion dollar domestic fishing industry. It protects the livelihoods of commercial fishermen, the hobbies of recreational fishermen, and the health of seafood consumers. Most commercial and recreational fishermen follow the rules, and NOAA's Enforcement Program ensures that they reap the benefits of fair competition and a level playing field in the market. Enforcement protects the health and the wallets of seafood consumers by ensuring that they know what they are getting.

NOAA's Enforcement Program is the only Federal or state agency program that is exclusively dedicated to Federal fisheries and marine resource enforcement. As a result OLE is uniquely qualified to be singularly committed to NOAA's core mission of ensuring compliance with the regulation established to maximize productivity of sustainable fisheries and fishing

²⁷ Fisheries of the United States (2013), <http://www.st.nmfs.noaa.gov/commercial-fisheries/fus/fus13/materials>

communities, as well as to ensure protection, recovery, and conservation of protected species and marine protected areas. OLE's personnel are the subject matter experts for Federal domestic and international fisheries enforcement. NOAA's approach to enforcement continues to emphasize compliance assistance and increases in monitoring and inspections to assist regulated parties in understanding and complying with regulations.

Resource Assessment:

NOAA enforcement and compliance assistance activities are currently funded through the Enforcement budget line and the requested funds will allow NOAA to carry out these priority activities through VMS and Marine Forensic efforts. Additional information on the resources for these activities can be found in the Enforcement narrative.

Schedule and Milestones:

FY 2016 – 2020:

- Continue to advance enforcement and compliance assistance efforts in support of NOAA's Office of Law Enforcement Operational Priorities through VMS and Marine Forensics activities

Deliverables:

FY 2016 – 2020:

- Provide compliance assistance support to the approximately 4,450 vessels under the VMS requirements of 23 fisheries management plans, two international convention areas, and the Papahānaumokuākea National Monument
- Provide marine forensic analyses for investigations involving potential mislabeling fraud

Performance Goals and Measurement Data:

Performance Measure:	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
Man hours of monitoring and inspections							
With Increase	N/A	N/A	33,570	33,570	33,570	33,570	33,570
Without Increase	28,394	27,900	30,450	30,450	30,450	30,450	30,450
Description: Total number of hours spent on inspections and monitoring.							

Performance Measure:	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
Man hours of Outreach							
With Increase	N/A	N/A	16,380	16,380	16,380	16,380	16,380
Without Increase	13,944	15,550	15,600	15,600	15,600	15,600	15,600
Description: Total number of hours spent on outreach.							

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: National Marine Fisheries Service
Sub-program: Enforcement
Program Change: Improving NOAA's Fisheries Enforcement & Compliance Assistance Capabilities

Object Class		FY 2016 Increase	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$25,160
11.3	Other than full-time permanent	0	70
11.5	Other personnel compensation	0	170
11.7	Special personnel services payments	0	88
11.9	Total personnel compensation	0	25,488
12	Civilian personnel benefits	0	9,971
13	Benefits for former personnel	0	1
21	Travel and transportation of persons	331	884
22	Transportation of things	0	92
23.1	Rental payments to GSA	0	2,008
23.2	Rental Payments to others	0	833
23.3	Communications, utilities and miscellaneous charges	0	625
24	Printing and reproduction	0	133
25.1	Advisory and assistance services	0	25,125
25.2	Other services	0	30
25.3	Purchases of goods & services from Gov't accounts	0	591
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	136	548
31	Equipment	383	660
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	28
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	850	67,018

Enforcement: Leveling the Playing Field for US Fisherman – Combating Illegal, Unreported and Unregulated Fishing and Seafood Fraud (Base Funding: \$66,168,000 and 217 FTE; Program Change: + \$3,000,000 and 15 FTE): NOAA requests an increase of \$3,000,000 and 15 FTEs for a total of \$69,168,000 and 232 FTE in the Enforcement Program to strengthen NOAA's efforts to detect and deter Illegal, Unreported and Unregulated (IUU) fishing and enforce restrictions on imports of illegally-harvested and improperly-documented seafood. These changes will provide training to enforcement personnel tasked with enforcing U.S. laws aimed at combatting IUU fishing, and for the resources to continue to assist foreign nations in building enforcement capacity, particularly with respect to implementation of the United Nations Food and Agriculture Organization (FAO) Agreement on Port State Measures to Prevent, Deter and Eliminate IUU Fishing. These efforts will enhance international cooperation and block the flow of IUU-caught fish into the stream of commerce and, ultimately, into the U.S. market.

Proposed Actions:

The NOAA Fisheries Office of Law Enforcement (OLE) will address the need for a coordinated national IUU enforcement program, which will include increased program and policy support for intelligence capability (including analysis targeting and investigation support), and increased deterrence efforts at key top Ports of Entry (\$2.5 million and 11 FTE). To increase deterrence efforts, Enforcement Officers will be placed strategically to address areas of highest risk by utilizing a list of Top 20 Ports of Entry for import of seafood and marine products and a risk-based assessment of high priority import targets. Special Agents will be strategically placed to investigate IUU fish trafficking or seafood fraud, and to further pursue suspected illegal activities detected by the Enforcement Officers in multiple ports of entry.

OLE will also develop and implement an IUU/International fisheries enforcement training program for domestic and international partners (\$500,000). The IUU training program and curriculum will be developed in collaboration with the NOAA Fisheries Office of International Affairs and General Counsel, and with the United States Coast Guard. The curriculum will be developed to augment NOAA's basic law enforcement training to ensure that domestic enforcement personnel are well-versed in international agreements and domestic laws aimed at combatting IUU fishing. In addition to training NOAA enforcement personnel, this training will also be provided to our Federal, State and Territorial enforcement partners. This program and curriculum will also be used to offer consistent international training and technical assistance to increase the capacity of foreign nations, in particular developing nations, to combat IUU fishing.

Statement of Need and Economic Benefits:

Global losses attributable to IUU fishing are estimated to be between \$10.0 and \$23.0 billion annually²⁸, weakening profitability for legally caught seafood, fueling illegal trafficking operations, and undermining economic opportunity for legitimate fishermen in the United States and food security in the developing world. As stated in the June 17, 2014 Presidential Memorandum – Comprehensive Framework to Combat Illegal, Unreported, and Unregulated Fishing and Seafood Fraud, it is in the national interest of the United States to promote a framework that supports sustainable fishing practices and combats seafood fraud and the sale of IUU fishing products. To achieve these objectives, the United States will need to enhance the tools it has available to combat IUU fishing and seafood fraud, including:

²⁸ Agnew DJ, Pearce J, Pramod G, Peatman T, Watson R, et al. (2009) Estimating the Worldwide Extent of Illegal Fishing. PLoS ONE 4(2): e4570. doi:10.1371/journal.pone.0004570

- implementing the United Nations Food and Agriculture Organization Agreement on Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing;
- strengthening coordination and implementation of existing authorities to combat IUU fishing and seafood fraud;
- working with Congress to strengthen and harmonize the enforcement provisions of U.S. statutes for implementing international fisheries agreements; and,
- working with industry and foreign partners to develop and implement new and existing measures, such as voluntary traceability programs, that can combat IUU fishing and seafood fraud, and ensure accurate labeling for consumers.

With current U.S. inspection capabilities at less than one percent of imports, NOAA will determine placement of new enforcement staff based on a risk-based assessment of high priority import targets and major Ports of Entry including the U.S. border areas. Developing a consistent curriculum and providing a coordinated training program for domestic as well as international enforcement personnel is also an important initial step in this process.

Resource Assessment:

NOAA domestic enforcement activities for international obligations are also currently funded through the Enforcement budget line and modest investments for international enforcement efforts, training, and capacity building are made when possible. Resources identified in this request would provide dedicated funding for IUU enforcement, training, and capacity building.

Schedule and Milestones:

FY 2016 – 2020:

- Hire and deploy enforcement personnel at strategic Ports of Entry
- Develop an IUU enforcement training program and curriculum
- Establish consistent international IUU enforcement training and technical assistance

Deliverables:

FY 2016 – 2020:

- Completed course curriculum for IUU enforcement training
- Pilot training course for NOAA, Federal, State, and Territory partners

Performance Goals and Measurement Data:

Enforcement

Performance Measure:	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
Investigations							
With Increase	N/A	N/A	2,250	2,325	2,400	2,400	2,400
Without Increase	3,695	2,520	2,250	2,250	2,250	2,250	2,250
Description: Total number of investigations conducted.							

Performance Measure: Hours of Patrol	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	30,450	39,575	48,700	48,700	48,700
Without Increase	28,394	27,900	30,450	30,450	30,450	30,450	30,450
Description: Total number of hours spent on inspections and monitoring.							

Performance Measure: Hours of Outreach	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	15,600	18,000	20,400	20,400	20,400
Without Increase	13,944	15,550	15,600	15,600	15,600	15,600	15,600
Description: Total number of hours spent on outreach.							

PROGRAM CHANGE PERSONNEL DETAIL

Budget Program: National Marine Fisheries Service
Sub-program: Enforcement
Program Change: Leveling the playing field for US fisherman – Combating Illegal, Unreported and Unregulated Fishing and Seafood Fraud

Title:	Location	Grade	Number of Positions	Annual Salary	Total Salaries
Policy Analyst	Silver Spring, MD	ZA-3	1	\$63,091	\$63,091
Investigative Analyst	Silver Spring, MD	ZA-3	2	\$63,091	\$126,182
Special Agent	Silver Spring, MD	ZA-4	1	\$89,924	\$89,924
Special Agent	Newport, OR	ZA-4	1	\$87,123	\$87,123
Special Agent	Honiara, Solomon Islands	ZA-4	1	\$72,391	\$72,391
Enforcement Officer	Dutch Harbor, Ak	ZA-3	2	\$63,330	\$126,660
Enforcement Officer	Kodiak, AK	ZA-3	1	\$63,330	\$63,330
Enforcement Officer	Newport, OR	ZA-3	1	\$61,126	\$61,126
Enforcement Officer	Los Angeles, CA	ZA-3	2	\$64,585	\$129,170
Enforcement Officer	New Bedford, MA	ZA-3	2	\$63,386	\$126,772
Enforcement Officer	Lafayette, LA	ZA-3	2	\$57,982	\$115,964
Enforcement Officer	Galveston, TX	ZA-3	2	\$65,372	\$130,744
Enforcement Officer	Honolulu, HI	ZA-3	1	\$59,175	\$59,175
Enforcement Officer	Honiara, Solomon Islands	ZA-3	1	\$50,790	\$50,790
Subtotal			<u>20</u>		<u>\$1,302,442</u>
2015 Pay Adjustment	1.0%				\$13,024
Total					\$1,315,466
Less Lapse	25%		<u>(5)</u>		<u>(\$328,867)</u>
Total Full-time permanent:			15		\$986,599
2016 Pay Adjustment	1.3%				\$12,826
TOTAL			15		\$999,425
Personnel Data			Number		
Full-time permanent			15		
Other than full-time permanent			<u>0</u>		
Total			15		
Authorized Positions:					
Full-time permanent			20		
Other than full-time permanent			<u>0</u>		

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: National Marine Fisheries Service
Sub-program: Enforcement
Program Change: Leveling the playing field for US fisherman – Combating Illegal, Unreported and Unregulated Fishing and Seafood Fraud

Object Class	FY 2016 Increase	FY 2016 Total Program
11 Personnel compensation		
11.1 Full-time permanent	\$999	\$26,159
11.3 Other than full-time permanent	0	70
11.5 Other personnel compensation	100	270
11.7 Special personnel services payments	0	88
11.9 Total personnel compensation	1,099	26,587
12 Civilian personnel benefits	300	10,271
13 Benefits for former personnel	0	1
21 Travel and transportation of persons	547	1,100
22 Transportation of things	719	811
23.1 Rental payments to GSA	0	2,008
23.2 Rental Payments to others	0	833
23.3 Communications, utilities and miscellaneous charges	0	625
24 Printing and reproduction	0	133
25.1 Advisory and assistance services	0	25,125
25.2 Other services	125	155
25.3 Purchases of goods & services from Gov't accounts	150	741
25.4 Operation and maintenance of facilities	0	0
25.5 Research and development contracts	0	0
25.6 Medical care	0	0
25.7 Operation and maintenance of equipment	0	0
25.8 Subsistence and support of persons	0	0
26 Supplies and materials	60	472
31 Equipment	0	277
32 Lands and structures	0	0
33 Investments and loans	0	0
41 Grants, subsidies and contributions	0	28
42 Insurance claims and indemnities	0	0
43 Interest and dividends	0	0
44 Refunds	0	0
99 Total obligations	3,000	69,168

APPROPRIATION ACCOUNT: OPERATIONS, RESEARCH, AND FACILITIES

SUB-PROGRAM: HABITAT CONSERVATION AND RESTORATION

The mission of the Habitat Conservation and Restoration Program is to protect and restore habitats that provide important societal and ecological benefits. The Program contributes to rebuilding fisheries, recovering protected species, and improving the resiliency of coastal communities. NOAA's mandate to conserve habitat is embedded in several pieces of legislation, including the Magnuson-Stevens Fishery Conservation and Management Act, Federal Power Act, and Energy Policy Act of 2005 (commercial and recreational fisheries); the Endangered Species Act (protected species); and the Oil Pollution Act and the Comprehensive Environmental Response, Compensation and Liability Act (trust resources injured from oil and hazardous waste spills).

The program plays an integral role in the conservation and management of fisheries, protected species, and corals. NOAA's Fisheries Management, Coral Reef Conservation, and Protected Species programs rely on habitat conservation expertise for implementing and managing habitat restoration projects, avoiding adverse impacts to habitat, determining and implementing appropriate conservation techniques for addressing threats to habitat, and monitoring conservation success. NOAA partners with Federal and state agencies, the public, academia, non-governmental organizations, industry, and tribes to leverage resources and implement priority conservation actions.

Healthy habitats sustain valuable commercial and recreational fisheries, which in 2011 supported more than 1.7 million jobs and generated over \$199.0 billion in sales (*Fisheries Economics of the United States, 2011*). Widespread habitat loss presents a challenge as NOAA seeks to sustain and rebuild the nation's fisheries. A recent report shows that we are losing coastal wetlands—prime nurseries for many species—at the rate of about 80,000 acres per year.²⁹ This rate of increase is 20,000 more acres per year than was lost during the 6-year period 1998–2004. Other areas have experienced great habitat losses. For example, 85 percent of Galveston Bay sea grasses are gone, and river herring—important prey for commercial species such as tuna and cod—have lost access to all but 27 percent of their historic habitat along the East Coast.³⁰

In response to these significant threats to habitat, we have developed the NOAA Habitat Blueprint (www.habitat.noaa.gov/blueprint), an innovative cross-NOAA strategy that will increase the effectiveness of NOAA's conservation efforts to improve habitat conditions for fisheries, coastal and marine life, and coastal communities. The Blueprint's guiding principles of prioritizing resources and activities across NOAA, implementing place-based habitat solutions, and fostering and leveraging partnerships are currently being implemented across the country. Under the Blueprint, NOAA has selected ten Habitat Focus Areas to maximize NOAA's habitat conservation and science investments and the benefits to marine resources and coastal communities. NOAA is developing Implementation Plans for each Focus Area that describe the major projects, the sequencing of actions, the indicators used to assess progress, and the outcomes envisioned.

²⁹ T.E. Dahl and S.M. Stedman. 2013. Status and trends of wetlands in the coastal watersheds of the Conterminous United States 2004 to 2009. U.S. Department of the Interior, Fish and Wildlife Service and National Oceanic and Atmospheric Administration, National Marine Fisheries Service. (46 p.) http://www.habitat.noaa.gov/pdf/Coastal_Watershed.pdf

³⁰ Restore America's Estuaries. 2011. Jobs & Dollars – Big Returns from Coastal Habitat Restoration http://estuaries.org/images/81103-RAE_17_FINAL_web.pdf

In addition to the Blueprint initiative, NOAA implements three programs for conserving important habitat for rebuilding fisheries and recovering protected species: 1) Sustainable Habitat Management to protect healthy habitats from loss and degradation; 2) Fisheries Habitat Restoration to restore injured, degraded, or lost habitat; and 3) Chesapeake Bay Protection and Restoration through environmental literacy, fisheries science, habitat restoration, and ecosystem observations.

Sustainable Habitat Management

Habitat management and protection is the first step and most cost-effective means for ensuring the long-term survival and health of fishery resources. Habitat management and protection is integral to ensuring healthy regional ecosystems and the host of benefits derived from healthy and productive marine, coastal, and riverine habitats. As marine fish depend on habitat for survival and reproduction, it is important to protect and restore the habitats that sustain commercial and recreational fisheries.

Sustainable habitat management integrates sound science and technical expertise to assist private organizations and Federal agency actions in the following areas:

- Protecting Essential Fish Habitat (EFH): The program minimizes impacts to EFH in consultation with Federal agencies whose proposed actions may affect EFH of federally managed species. In coordination with the Regional Fishery Management Councils, the program describes and identifies EFH and evaluates the effects of proposed Federal actions. This work ensures that proposed actions posing threats to marine, coastal, and riverine EFH are undertaken in a manner that prevents, minimizes, or compensates for adverse effects.

NOAA provides conservation recommendations for proposed construction projects, applications for dredging and filling wetlands, waste discharge permits, renewable energy proposals, and other Federal funding and permit activities that may adversely affect EFH. These efforts have been successful—NOAA has protected more than 100,000 acres from non-fishing impacts through the EFH program each year. The consultation program provides NOAA with thousands of opportunities each year to guide development in a manner that protects fish habitat without hindering economic opportunity.

- Providing fish passage at hydroelectric dams: The program ensures passage for migratory fish past hydroelectric dams that block valuable river miles. NOAA can require fish passage through the development of mandatory conditions under the Federal Power Act for the safe, timely, and effective passage of migrating fish at hydropower dams licensed by the Federal Energy Regulatory Commission (FERC). This unique role and responsibility granted to NOAA by the Federal Power Act also presents a limited window of opportunity for NOAA action, because license renewals are generally approved for 30 to 50 years. Each year there are opportunities for the program to engage in additional new FERC hydropower licensings and relicensings. Since 2004, the Hydropower Program has opened up passage along more than 1,300 miles of streams and rivers that had been blocked by hydropower dams.
- Utilizing partnerships for habitat conservation: NOAA recognizes the need to leverage expertise and resources to maximize habitat conservation results, and has been a leader in efforts to build Federal and state partnerships under the National

Fish Habitat Action Plan. These efforts enhance habitat sustainability and support the goals of increased commercial and recreational fish populations and resilient coastal communities.

- Protecting deep-sea corals: Since initial funding in FY 2009, NOAA has implemented the MSA authorized Deep Sea Coral Research and Technology Program to identify and map locations of deep-sea corals and to analyze and provide scientific information needed to protect their habitats. The MSA also provides Regional Fishery Management Councils with discretionary authority to designate zones to protect deep-sea corals identified by the program from physical damage from fishing gear. NOAA implements this work in coordination with other Federal agencies and research institutions. Major outcomes from the work include discovering new deep-sea coral habitats, providing relevant information to Council management efforts.

Fisheries Habitat Restoration

NOAA, as directed by the MSA, implements and supports restoration of priority coastal, marine, and riverine habitats essential for the reproduction, growth, and sustainability of commercial and recreational fisheries. NOAA's Restoration Center provides a full range of restoration expertise and services (e.g., planning and consultation for project design, engineering, environmental compliance, and permitting; oversight during implementation and construction; and monitoring and evaluation of project success), and financial support for habitat restoration projects nationwide, capitalizing on the investments of partnering organizations to help us meet MSA and ESA requirements for rebuilding stocks and recovering protected species.

The NOAA Restoration Center also manages restoration planning and implementation activities for Natural Resource Damage Assessment (NRDA) and Restoration Trustee responsibilities for all active cases (e.g., Deepwater Horizon (DWH) oil spill) as required by the Oil Pollution Act (OPA) and Comprehensive Environmental Response, Compensation and Liability Act (CERCLA, or Superfund Act). In addition, staff provide restoration services across other NOAA programs, including the Coral Reef Conservation Program, Marine Debris Program, National Marine Sanctuaries Program, Office of Response and Restoration, and Protected Species Program.

Habitat restoration benefits local economies through improved habitat conditions that support recreational and commercial uses, as well as increased resiliency of coastal resources. In addition, habitat restoration projects support a variety of job types in local communities—including construction workers and project managers working directly onsite—as well as other businesses and professionals who design, engineer, provide materials for, and monitor the success of these projects. And, unlike in other economic sectors, restoration jobs cannot be outsourced to far-off places. In an Oregon-based study, an average of \$0.80 of every \$1.00 spent on a restoration project stayed in the county where the project was located, and \$0.90 stayed in the state.³¹

³¹ Hibbard, M. and S. Lurie. 2006. "Some Community Socio-Economic Benefits of Watershed Councils: A Case Study From Oregon." *Journal of Environmental Planning and Management* 49: 891-908. *In Oregon's Restoration Economy* http://www.ecotrust.org/wwri/downloads/WWRI_OR_brochure.pdf

NOAA's restoration services focus on:

- Restoring injured or lost habitat: The NOAA Restoration Center leads restoration planning and implementation, and monitors the success of implemented restoration projects for coastal and marine resources threatened or injured by oil spills, waste sites, or ship groundings (e.g., injured coral reefs, damaged sea turtle nesting sites and fishery habitat, and lost recreational opportunities). The scientific and policy expertise housed in this program is critical to NOAA's ability to respond to oil spills and hazardous waste releases and to restore habitats and resources after these events. Through the program, injuries to habitat are repaired when possible and any lost natural resources are replaced through restoration projects that focus on revitalizing and improving coastal and marine habitats such as wetlands, coral reefs, and submerged aquatic vegetation.

Although NRDA restoration projects are often supported with funding recovered from polluters, the restoration expertise and leadership required for project planning, implementation, and monitoring is provided with Habitat Management and Restoration resources. Appropriated funding is needed to pay for this expertise as well as some of the non-reimbursable labor costs associated with running an NRDA program. NRDA case work is only reimbursable when a responsible party is identified and a legal agreement is reached, and even then some of the labor costs incurred are not covered. NOAA must cover these labor costs completely when no responsible party can be identified or when that party has no ability to pay.

NOAA's Restoration Center works to ensure that restoration under NRDA is coordinated with other restoration efforts. For example, as multiple Gulf of Mexico recovery restoration initiatives begin, the Restoration Center will have a critical role in coordinating NOAA's NRDA restoration planning and implementation with RESTORE Act activities to avoid duplication of efforts.

- Targeting restoration of priority habitats: The Community-based Restoration Program (CRP) supports fishery rebuilding efforts and the recovery of listed species through the restoration of spawning and rearing habitat provided by wetlands, rivers, oyster reefs, and coral reefs in targeted areas (e.g., Blueprint Focus Areas and areas identified in recovery plans or fishery management plans).

NOAA provides the planning, engineering, and design expertise and the financial support not found in local communities for habitat restoration projects. This highly successful national effort partners with state and local governments, nonprofit organizations, and local communities, and regularly leverages non-Federal to Federal funds by factors of 3-to-1. The results demonstrate the benefits of healthy habitat for fish. For example, just three years after the culvert connecting Bride Brook to Long Island Sound was enlarged, the herring population has grown roughly 484 percent, from 75,000 to 363,224 fish in spring 2013. Herring is an important prey species for cod and other federally managed species in the Northeast.

NOAA is strategically investing in larger-scale habitat restoration to achieve greater impacts. Restoration is focused in targeted areas where NOAA can significantly affect protected species or fisheries recovery through habitat restoration. Habitat restoration

projects are selected through a competitive solicitation process that leverages substantial investments from partners. Larger-scale projects are more complex and tend to be multiyear projects.

- Implementing the Estuary Restoration Act: The Estuary Restoration Act Program was created in response to the Estuary Restoration Act of 2000 (ERA) to make restoring estuaries a national priority. The Estuary Restoration Program maintains a national inventory of restoration projects, supports the work of the ERA Council, and provides assistance for restoration project monitoring.

Chesapeake Bay Protection and Restoration

The NOAA Chesapeake Bay Office (NCBO) applies expertise in fisheries, aquatic habitats, environmental literacy and stewardship, and in-water observations to protect and restore the Chesapeake Bay. NCBO programs exemplify an integrated approach to ecosystem management, enabling scientists and resource managers to examine the interconnected elements of the Bay ecosystem and ensuring that Bay residents have a holistic understanding of its treasured natural and cultural resources. NCBO is the primary agent for meeting NOAA's mandate, authorized by P.L. 107-372, to coordinate programs and activities of the agency to support the 2014 Chesapeake Bay Watershed Agreement and implement the agency's requirements under Executive Order 13508 (EO). NCBO carries out programs in: 1) habitat assessment and characterization supporting oyster restoration, 2) fisheries research and ecosystem modeling, 3) environmental literacy and community engagement, and 4) ecosystem observations.

In FY 2016, NCBO will support targeted restoration, conservation, and monitoring of vital habitats and key resources; synthesize and deliver scientific data to support management of oysters, blue crab, striped bass, and other ecologically and commercially important species; and provide educators and communities with timely and credible information on the Bay ecosystem. NCBO will continue to operate and maintain the Chesapeake Bay Interpretive Buoy System (CBIBS) and will also use emerging technologies for data collection and dissemination, such as real-time data sensors, predictive modeling, and smart phone apps that improve scientific understanding of the dynamic Bay and enhance the user experience. As part of the Habitat Blueprint effort in the Choptank River Watershed Habitat Focus Area, NOAA activities include:

- Restoring degraded oyster reef habitat to increase native oyster populations and finfish habitat
- Rebuilding and sustaining important fish habitat
- Quantifying the benefits oyster reefs and associated habitats provide (water quality, enhanced finfish habitat)
- Improving delivery of NOAA's habitat science in the context of a changing climate, sea level rise and coastal inundation, land use, and hydrologic patterns that drive delivery of nutrient and sediment pollution to this tidal tributary

Schedules and Milestones:

FY 2016–2020

- Conduct priority project consultations each year to protect EFH
- Work with 10 coastal and marine Fish Habitat Partnerships to develop and implement strategic plans
- Conduct deep-sea coral research activities in conjunction with habitat characterization cruises

- Develop management options for protecting deep-sea corals in partnership with the Regional Fishery Management Councils and National Marine Sanctuaries
- Participate in the re-licensing process for an estimated 125 hydroelectric projects.
- Develop and select strategic national restoration projects (FY 2016)
- Develop and implement restoration plans for addressing NRDA, OPA, and CERCLA injuries to NOAA trust resources
- Develop and implement priority restoration projects critical for NOAA trust resources
- Evaluate restoration projects to better quantify the socioeconomic and ecological benefits
- Implement habitat conservation and science actions in selected habitat focus areas and regional initiatives under the NOAA Habitat Blueprint framework
- Develop habitat conservation targets for Habitat Blueprint focus areas
- Participate in the Chesapeake Bay Program activities to establish and implement interagency research, assessment, and restoration priorities consistent with NOAA's mission and the 2014 Chesapeake Bay Watershed Agreement
- Conduct and/or synthesize side scan, multi-beam, and patent tong survey of proposed tributaries for planning and evaluating oyster restoration, including ecosystem services of restored reefs
- Improve understanding of fish and shellfish health (blue crab, oysters, striped bass, and other ecologically and commercially significant species) through targeted external research, habitat assessment and characterization, and development of trophic- and ecosystem-based model runs
- Implement trainings and community engagement programming focused on NOAA priorities through the Environmental Science Training Center located in Oxford, Maryland

Deliverables:

FY 2016–2020

- Leveraged and expanded local, interagency, and NGO partnership efforts in Habitat Blueprint focus areas to achieve measurable conservation results
- Management-driven research products to better understand how deep-sea corals function as habitat for fish and invertebrates
- Accurate deep-sea coral habitat distribution maps that allow managers to better protect these biologically rich ecosystems
- Improved assessments of potential fisheries impacts to deep-sea coral habitats.
- Increased presence of target migratory fish species
- Technical guidance and assistance provided to NOAA partners, Federal action agencies, and resource decision-makers to achieve protection and restoration of NOAA trust resources
- Restoration plans reviewed and approved through NRDA public process.
- Restoration requirements met as defined by specific NRDA settlements.
- Development of maps and habitat assessments annually in furtherance of oyster restoration in the Chesapeake Bay

- Maintenance of a system of 10 oceanographic and atmospheric buoys in the Chesapeake Bay and delivery of derived products to users in a reliable and timely manner

Performance Goals and Measurement Data:

Performance Measure:	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
Number of Habitat Acres Restored (Annually) (Measure 3.4f)	29,407 ¹	32,460	45,500	46,800	48,000	48,000	48,000
Habitat Acres	8,038	8,445	4,500	5,800	6,000	6,000	6,000
ARRA Acres ²	1,316	1,015	0	0	0	0	0
PCSRF acres ³	20,103	23,000	41,000	41,000	42,000	42,000	42,000
Overlap ⁴	-50	--	--	--	--	--	--

Description: NOAA restores habitat areas lost or degraded as a result of development and other human activities, as well as specific pollution incidents and sources. Activities are geared toward NOAA trust resources found across the marine environment, including the Great Lakes region, and are supportive of anadromous fish species. The intent of this measure is to summarize or project the geographic area over which ecosystem function has been or will be improved as the direct result of habitat restoration efforts. This measure does not include restoration conducted through Natural Resource Damage Assessments or the Species Recovery Grants.

1. Number of acres shown for FY 2014 actuals reflect total acres reported. Total acres reported takes into account joint acres i.e., acres restored that have been supported and reported by both Habitat and PCSRF for the same project but not necessarily the same activity. For example, Habitat may fund the engineering phase of a project and PCSRF may fund the construction phase. Consequently, the total reported is less than the sum of Habitat, ARRA, and PCSRF acres to account for double counting. In FY 2014 there were 50 joint acres reported.

2. American Recovery and Reinvestment Act (ARRA)

3. PCSRF FY 2015 targets represent the expected acres restored from funded projects with an anticipated completion date within the respective fiscal years. FY 2016 through FY 2020 targets are based on formula projections of acres restored based on program appropriations and past program performance.

4. Represents the overlap in habitat acres restored due to jointly funded PCSRF and NOAA Restoration Center projects. These "overlap" acres are include in the PCSRF and Habitat totals, respectively, but deducted from the total number of NOAA habitat acres restored.

Performance Measure:	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
Stream miles made accessible	594 ¹	825	570	570	580	580	580
Habitat stream miles	194	225	130	130	130	130	130
ARRA stream miles ²	9	50	0	0	0	0	0
PCSRF stream miles ³	442	550	440	440	450	450	450
Overlap ⁴	-51	--	--	--	--	--	--

Description: This performance measure counts stream miles made accessible as a result of Habitat Program activities. Stream miles made accessible in this context will include barrier removal and fish passage projects that support recovery of listed species.

1. Number of stream miles shown for FY 2014 actuals reflect total stream miles reported. Total stream miles reported takes into account joint stream mile i.e., stream miles made accessible through projects funded by both Habitat and PCSRF for the same project but not necessarily the same activity. For example, Habitat may fund the removal of a passage-blocking culvert at a road crossing, and PCSRF may fund the construction of a bridge to replace the removed culvert. Consequently, the total reported is less than the sum of Habitat, ARRA, and PCSRF stream miles to account for double counting. In FY 2014 there were 51 joint stream miles reported.

2. American Recovery and Reinvestment Act (ARRA)

3. PCSRF FY 2015 targets represent the expected stream miles made accessible from funded projects with an anticipated completion date within the respective fiscal years. FY 2016 through FY 2020 targets are based on formula projections of stream miles based on program appropriations and past program performance.

4. Represents the overlap in stream miles due to jointly funded PCSRF and NOAA Restoration Center projects. These "overlap" stream miles are include in the PCSRF and Habitat totals, respectively, but deducted from the total number of NOAA stream miles made accessible.

Performance Measure:	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
Conduct pre and post restoration monitoring in 10 Chesapeake Bay tributaries by 2025 (cumulative)	2	4	5	6	7	8	9

Description: This performance measure projects the cumulative number of tributaries monitored before and after tributary-scale restoration has occurred. Monitoring includes hydrographic surveys to quantify "restorable bottom" (a key decision support product that helps guide pre restoration planning) and post construction surveys of restored reefs. This measure tracks progress by NOAA and partners to meet the 2014 Chesapeake Bay Watershed Agreement oyster outcome: "Continually increase fish and shellfish habitat and water quality benefits from restored oyster populations. Restore native oyster habitat and populations in 10 tributaries by 2025 and ensure their protection."

PROGRAM CHANGES FOR FY 2016:

Habitat Management and Restoration: Increase Consultation and Essential Fish Habitat Implementation Capacity (Base Funding: \$3,500,000 and 8 FTE; Program Change: +\$5,671,000 and + 12 FTE): NOAA requests an increase of \$5,671,000 and 12 FTE for a total of \$9,171,000 and 20 FTE for consultations and program implementation mandated by Section 305(b) of the MSA in Habitat Management and Restoration in support of the nearly \$200.0 billion U.S. commercial and recreational fishing industries.³²

The initiative to broadly invigorate NOAA's consultation capacity also addresses needs with regard to Endangered Species Act (ESA) Marine Mammal Protection Act (MMPA) consultations. The balance of this consultation initiative addressing that focus is addressed by a complementary program change of \$13,230,000 and 26 FTE located within the Marine Mammals, Sea Turtles and Other Species PPA.

Proposed Actions:

NOAA is facing four emerging large-scale natural resource management and conservation issues that will challenge its ability to meet consultation and permitting requirements under the MSA:

- (1) additional consultation and permitting requirements related to the California drought;
- (2) significantly increasing consultation and permitting needs in the Southeast and the Pacific Island Regions in response to new coral species listings;
- (3) additional consultation and permitting requirements resulting from Gulf of Mexico restoration activities related to the Deepwater Horizon oil spill; and
- (4) compliance with *Executive Order 13604 for Improving Performance of Federal Permitting and Review of Infrastructure Projects*.

The proposed funding will be used to increase NOAA's capacity by hiring staff and contractors to conduct MSA Essential Fish Habitat (EFH) consultations as well as fill critical information gaps to support effective and timely completion of EFH reviews as required by the implementing regulations for MSA Section 305(b). Consultation activities include providing technical assistance, reviewing permits, conducting consultations, and engaging in post-project implementation monitoring and adaptive management to ensure project improvements are realized. Additional funding also will allow NOAA to undertake more programmatic consultations, which create efficiencies by establishing a framework by which individual projects can be planned, authorized, and implemented as well as establishing consistencies across larger areas, often at regional or national scales.

This initiative supports the Cross-Agency Priority (CAP) Goal for Infrastructure Permitting Modernization. The requested funding to increase capacity will allow NMFS to reduce delays and improve permitting and review timeframes for projects that benefit the Nation's economy and create new jobs.

Statement of Need and Economic Benefits:

Section 305(b) of MSA requires Federal agencies to consult with NOAA on all actions (or proposed actions) authorized, funded, or undertaken by the agency that may adversely affect

³² National Marine Fisheries Service. 2014. Fisheries Economics of the United States, 2012. U.S. Dept. Commerce, NOAA Tech. Memo. NMFS-F/SPO-137, 175p; Available at: <https://www.st.nmfs.noaa.gov/st5/publication/index.html>

EFH. NOAA issues recommendations to avoid, minimize, mitigate, or otherwise offset those adverse habitat effects; in turn, action agencies must provide a detailed response to NOAA's recommendations. Consultations are NMFS' opportunity to enhance Fishery Management Council actions to sustain and rebuild fisheries. The Councils take action to prevent overfishing and to protect EFH from adverse fishing impacts (e.g., gear modifications). NMFS conducts EFH consultations to protect EFH from non-fishing impacts.

For example, NMFS worked with the U.S. Army Corps of Engineers on an erosion control project requested by the Commonwealth of Massachusetts. The project involved using 500,000 cubic yards of sand and gravel from a 103-acre offshore site in Massachusetts Bay for erosion control on 37 acres of Winthrop Beach. However, the materials would be moved from an area of the Bay designated as essential fish habitat for 26 federally managed species including Atlantic cod. Atlantic cod is an overfished but economically, ecologically, and culturally significant New England fishery that is valued at over \$30.0 million.³³ In order to avoid the negative impacts of the proposed project, NOAA advised the Corps on alternative sources of material to implement the project and in the process helped to support cod recovery efforts in Massachusetts.

NMFS also worked with regulatory and natural resource agencies on a proposed major expansion of a phosphate mine in North Carolina that would have caused the largest single source of wetland loss and alteration in the southeastern United States in several decades. As a result of NMFS' recommendations, the mine expansion will avoid primary fish nursery areas designated as Habitat Areas of Particular Concern as well as pristine bottomland hardwood forests. The project also included a multimillion dollar monitoring program, the restoration of 8,000 acres of wetlands, and the preservation of almost 2,500 more acres. These consultations minimized adverse impacts to essential fish habitat without hindering local economies – the phosphate mine is the largest employer in Beaufort County.

Currently, NMFS is not able to review at least 25 percent of Federal projects that may adversely impact EFH due to staffing limitations. NOAA anticipates an unprecedented number of conservation projects – and therefore, requests for EFH consultations – resulting from the influx of new funding from Deepwater Horizon Natural Resource Damage Assessment, RESTORE Act implementation, Clean Water Act criminal penalties in the Gulf Environmental Benefit Fund administered by National Fish and Wildlife Foundation, and the Gulf of Mexico Energy Security Act of 2006. Recommendations provided through EFH consultations will maximize the habitat benefits for fisheries that will result from these projects including wetland restoration that supports the \$300.0 million Gulf shrimp fishery.³⁴ In California, the severe drought reduces the area salmon need to reproduce and habitat protection measures provided through EFH consultations will benefit these vulnerable areas and help recover valuable protected species. In both the Southeast and Pacific Islands Regions, the listing of several coral species will greatly increase requirements for consultations under the Endangered Species Act. As shallow coral reefs in both regions have been designated as EFH for many years, significant coral expertise from the habitat program is needed to support NOAA's responsibilities. The agency will use an integrated strategy to combine consultations under ESA and MSA that will leverage data and staff resources to streamline the response to Federal action agencies.

³³ Fisheries of the United States, 2012; Available at: <http://www.st.nmfs.noaa.gov/comercial-fisheries/fus/fus12/index>

³⁴ Ibid

Pre-existing consultation backlogs already exist due to the current volume of consultation requests that NMFS receives as compared to staff available to meet this existing demand. This existing backlog will severely impede NMFS' ability to address new demands. The gap between current workload capacity and anticipated capacity presents organizational, political, and business risks for NOAA, as well as direct and indirect economic consequences of an inadequate environmental compliance response. The consequences of incomplete or delayed EFH consultations include potential damage to the habitats that are the foundation for our Nation's fisheries and hampered decision-making on important economic development projects.

Resource Assessment:

MSA EFH consultations and program implementation are funded primarily through the Habitat Management and Restoration budget line. Approximately \$3.5 million in current resources are used to conduct thousands of EFH consultations around the nation each year and limited participation in the regional fishery management council and interstate marine fishery commission processes to fulfill the MSA mandate to protect essential fish habitat from adverse effects of fishing and non-fishing activities proposed by Federal agencies. These funds support required consultations with Federal agencies on any action that may adversely affect EFH.

Schedule and Milestones:

FY 2016–2020:

- Provide technical assistance, consultation and authorization services for all Federal agencies' proposed actions
- Develop programmatic consultation mechanisms including integrated consultations with ESA
- Conduct reviews of EFH designations every five years as required
- Increase collaboration at the state commission and Federal council levels to improve effective management of EFH

Deliverables:

FY 2016–2020:

- 500 additional MSA EFH consultations conducted per year

Performance Goals and Measurement Data:

Performance Measure: Number of coastal and marine habitat acres protected from harmful non-fishing impacts or identified threats	FY 2014 Actual¹	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	79,000	79,000	79,000	79,000	79,000
Without Increase	869,607,947	53,000	53,000	53,000	53,000	53,000	53,000

Description:

This measure tracks the number habitat acres where NOAA’s actions have reduced or averted threats from non-fishing impacts to habitat important for NOAA trust resources. Examples of non- fishing activities include dredging and filling wetlands, waste discharge permits, renewable energy proposals, and other Federal activities that may adversely affect essential fish habitat (EFH). An area is considered protected when a habitat threat originally proposed is reduced or averted through NMFS early coordination (as identified in Section 600.920(a)(3) of the Magnuson Stevens Act EFH regulations, application of existing NMFS policy/guidance documents (e.g. programmatic EFH consultation, habitat protection policies, etc.), EFH consultation, Endangered Species Act consultation, Fish & Wildlife Coordination Act consultation, and/or via the National Environmental Policy Act review process.

1. The FY 2014 actual for acres protected includes a very large (over 869 million acres) Programmatic Essential Fish Habitat Consultation conducted in Alaska encompassing the entire Alaskan EEZ to address Oil Spill response mechanisms to increase the ability of responding action agencies (U.S. Coast Guard and U.S. Environmental Protection Agency) for avoiding, minimizing, and mitigating impacts of oil spills on our living marine resources.

PROGRAM CHANGE PERSONNEL DETAIL

Budget Program: National Marine Fisheries Service
Sub-Program: Habitat Conservation and Restoration
Program Change: Increase Consultation and Essential Fish Habitat Implementation Capacity

Title:	Location	Grade	Number of Positions	Annual Salary	Total Salaries
Fishery Biologist	St. Petersburg, FL	ZP-3	3	\$57,982	\$ 173,946
Fishery Biologist	Honolulu, HI	ZP-3	3	\$59,175	\$ 177,525
Fishery Biologist	Sacramento, CA	ZP-3	1	\$62,065	\$ 62,065
Fishery Biologist	Seattle, WA	ZP-3	1	\$61,867	\$ 61,867
Fishery Biologist	Silver Spring, MD	ZP-3	2	\$63,091	\$ 126,182
Fishery Biologist	Gloucester, MA	ZP-3	3	\$63,386	\$ 190,158
Fishery Biologist	Juneau, AK	ZP-3	2	\$63,330	\$ 126,660
Fishery Biologist	Long Beach, CA	ZP-3	1	\$64,585	\$ 64,585
Subtotal			<u>16</u>		<u>\$ 982,988</u>
2015 Pay Adjustment	1.0%				\$9,830
Total					\$992,818
Less Lapse	25%		<u>(4)</u>		<u>(\$248,205)</u>
Total Full-time permanent:			12		\$744,613
2016 Pay Adjustment	1.3%				\$9,680
TOTAL			12		\$754,293
Personnel Data			Number		
Full-time permanent			12		
Other than full-time permanent			<u>0</u>		
Total			12		
Authorized Positions:					
Full-time permanent			16		
Other than full-time permanent			<u>0</u>		
Total			16		

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: National Marine Fisheries Service
Sub-Program: Habitat Conservation & Restoration
Program Change: Increase Consultation and Essential Fish Habitat Implementation Capacity

Object Class	2016 Increase	2016 Total Program³⁵
11 Personnel compensation		
11.1 Full-time permanent	\$754	\$19,668
11.3 Other than full-time permanent	0	365
11.5 Other personnel compensation	0	193
11.8 Special personnel services payments	0	5
11.9 Total personnel compensation	754	20,231
12 Civilian personnel benefits	231	6,187
13 Benefits for former personnel	0	1
21 Travel and transportation of persons	25	538
22 Transportation of things	0	161
23.1 Rental payments to GSA	0	1,692
23.2 Rental Payments to others	0	285
23.3 Communications, utilities and miscellaneous charges (boats)	0	1,063
24 Printing and reproduction	0	148
25.1 Advisory and assistance services	4,596	10,317
25.2 Other services	0	228
25.3 Purchases of goods & services from Gov't accounts	0	976
25.4 Operation and maintenance of facilities	0	0
25.5 Research and development contracts	0	10
25.6 Medical care	0	0
25.7 Operation and maintenance of equipment	0	0
25.8 Subsistence and support of persons	0	0
26 Supplies and materials	26	1,026
31 Equipment	39	249
32 Lands and structures	0	0
33 Investments and loans	0	0
41 Grants, subsidies and contributions	0	19,773
42 Insurance claims and indemnities	0	0
43 Interest and dividends	0	0
44 Refunds	0	0
99 Total obligations	5,671	62,885

³⁵ Due to financial system limitations, the object class detail for the Program reflects the Habitat Management and Restoration PPA.

Habitat Management and Restoration: Coastal Resiliency Ecosystem Grants (Base Funding: \$5,000,000 and 0 FTE; Program Change: -\$5,000,000 and 0 FTE): NOAA requests a decrease of \$5,000,000 and 0 FTE for Coastal Resiliency Ecosystem Grants, for a total of \$0 and 0 FTE for Coastal Resiliency Ecosystem Grants.

Proposed Actions:

NOAA proposes to eliminate funding for coastal resiliency ecosystem grants funded under this budget line in FY 2015 to consolidate funding for this activity in FY 2016 in NOAA’s National Ocean Service (NOS) request for an expanded Regional Coastal Resilience Program. NOAA’s NOS is requesting a total of \$50.0 million for Regional Coastal Resilience grants under the Coastal Management Grants line (NOS – 53) that will increase the resilience of coastal communities and ecosystems to the impacts of weather events, climate hazards and changing ocean conditions and uses as well as contribute to stronger fishing economies, and helping communities better manage and protect the natural resources upon which their livelihoods rely.

Performance Goals and Measurement Data:

Performance Measure: Number of Habitat Acres Restored (Annually) (Measure 3.4f) Habitat Acres only	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Decrease	N/A	N/A	4,500	5,300	4,200	4,000	4,000
Without Decrease	8,038	8,445	4,500	5,800	6,000	6,000	6,000
Description: NOAA restores habitat areas lost or degraded as a result of development and other human activities, as well as specific pollution incidents and sources. Activities are geared toward NOAA trust resources found across the marine environment, including the Great Lakes region, and are supportive of anadromous fish species. The intent of this measure is to summarize or project the geographic area over which ecosystem function has been or will be improved as the direct result of habitat restoration efforts. This measure does not include restoration conducted through Natural Resource Damage Assessments or the Species Recovery Grants.							

Performance Measure: Stream miles made accessible (Annually) Habitat stream miles only	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Decrease	N/A	N/A	130	100	100	100	100
Without Decrease	194	225	130	130	130	130	130
Description: This performance measure counts stream miles made accessible as a result of Habitat Program activities. Stream miles made accessible in this context will include barrier removal and fish passage projects that support recovery of listed species.							

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: National Marine Fisheries Service
Sub-Program: Habitat Conservation & Restoration
Program Change: Coastal Resiliency Ecosystem Grants

Object Class	2016 Decrease	2016 Total Program ³⁶
11 Personnel compensation		
11.1 Full-time permanent	\$0	\$18,914
11.3 Other than full-time permanent	0	365
11.5 Other personnel compensation	0	193
11.8 Special personnel services payments	0	5
11.9 Total personnel compensation	0	19,477
12 Civilian personnel benefits	0	5,956
13 Benefits for former personnel	0	1
21 Travel and transportation of persons	0	513
22 Transportation of things	0	161
23.1 Rental payments to GSA	0	1,692
23.2 Rental Payments to others	0	285
23.3 Communications, utilities and miscellaneous charges	0	1,063
24 Printing and reproduction	0	148
25.1 Advisory and assistance services	0	5,721
25.2 Other services	0	228
25.3 Purchases of goods & services from Gov't accounts	0	976
25.4 Operation and maintenance of facilities	0	0
25.5 Research and development contracts	0	10
25.6 Medical care	0	0
25.7 Operation and maintenance of equipment	0	0
25.8 Subsistence and support of persons	0	0
26 Supplies and materials	0	1,000
31 Equipment	0	210
32 Lands and structures	0	0
33 Investments and loans	0	0
41 Grants, subsidies and contributions	(5,000)	14,773
42 Insurance claims and indemnities	0	0
43 Interest and dividends	0	0
44 Refunds	0	0
99 Total obligations	(5,000)	52,214

³⁶ Due to financial system limitations, the object class detail for the Program reflects the Habitat Management and Restoration PPA.

APPROPRIATION ACCOUNT: PACIFIC COASTAL SALMON RECOVERY FUND

Land-use, harvest, and hatchery practices, as well as changing ocean conditions, have increased the vulnerability of Pacific salmonid populations, contributing to their decline and the listing of many populations as threatened or endangered under the Endangered Species Act (ESA). Over the course of their life cycle, salmonids require suitable habitat in mainstem rivers, tributaries, coastal estuaries, wetlands, and the Pacific Ocean. A number of environmental challenges affect the survival of salmonids, including variability in ocean conditions, destruction of nearshore and freshwater habitats, and other natural- and human-caused ecosystem changes.

The Pacific Coastal Salmon Recovery Fund (PCSRF) was established by Congress in FY 2000 to protect, restore, and conserve Pacific salmonids and their habitats. The Congressionally authorized activities that were funded under the PCSRF program included: (1) conserving salmon and steelhead populations that are listed as threatened or endangered, or identified by a state as at-risk to be so listed; (2) maintaining populations necessary for exercise of tribal treaty fishing rights or native subsistence fishing; and (3) conserving Pacific coastal salmon and steelhead habitat. NMFS provides competitive funding to states and tribes of the Pacific Coast region to implement projects that restore and protect salmonid populations and their habitats. Eligible applicants include the States of Washington, Oregon, California, Idaho, Nevada and Alaska and federally recognized tribes of the Columbia River and Pacific Coast (including Alaska). States are required to provide 33 percent matching funds, and PCSRF awards are supplemented further by significant private and local contributions at the project level. No match is required from the federally recognized tribes.

Key accomplishments for PCSRF-funded activities from FY 2000-2014 include:

- More than 1,043,000 acres of habitat restored, protected, and made accessible.
- Over 8,600 miles of stream opened.

Habitat restoration activities funded by PCSRF are an important component of overall salmonid recovery efforts in the Pacific Coast region. Restoration projects have increased the quality and quantity of spawning and rearing habitat from stream headwaters to coastal estuaries. Upstream restoration activities have controlled erosion, enhanced in-stream flow and streambed conditions, and provided the habitat necessary for successful spawning and egg survival. Estuary and wetland restoration projects closer to the coast have protected and improved feeding and rearing habitat used by juvenile fish as they transition from freshwater to the open ocean. PCSRF restoration projects have also removed over 2,500 barriers to fish passage along small creeks and streams, restoring access to high-quality habitat. Additionally, PCSRF habitat projects provided a number of benefits to the human community, including enhanced water quality, recreation opportunities, flood control, and coastline protection. Recent studies suggest that a \$1.0 million investment in watershed restoration, of which PCSRF and state matching funds play a significant role, creates on average 16³⁷ to 17³⁸ new “green” jobs and averages \$2.3 million³⁹ in economic activity.

³⁷ Nielsen-Pincus, M., and C. Moseley. 2010. Economic and employment impacts of forest and watershed restoration in Oregon. University of Oregon, Institute for a Sustainable Environment, Ecosystem Workforce Program, Working Paper Number 24, Spring 2010.

³⁸ Edwards, P.E.T., A.E. Sutton-Grier and C.E. Coyle. 2013 Investing in nature: Restoring coastal habitat blue infrastructure and green job creation. *Marine Policy* 38:65-71.

³⁹ Nielsen-Pincus, M., and C. Moseley. 2010. Economic and employment impacts of forest and watershed restoration in Oregon. University of Oregon, Institute for a Sustainable Environment, Ecosystem Workforce Program, Working

Additionally, approximately 80 percent of habitat restoration investments are spent locally in the county in which the project is located, and over 90 percent is spent within the state⁴⁰, supporting local jobs and local economies often in rural and economically distressed communities. Since 2000, the PCSRF has funded more than 11,500 projects along the Pacific Coast that contribute to preventing extinction and improving the status of ESA-listed species and their habitats, as well as supporting and protecting healthy populations. Projects range from single-site culvert replacement to hundreds of acres of habitat acquisition and restoration. As projects are completed, state and tribal grantees are required to collect and report project specific data to inform the PCSRF performance metrics. The PCSRF program ensures that funded projects are implementing the priority actions that address the identified factors limiting salmon and steelhead recovery, as specified in NOAA's ESA recovery plans.

Schedule and Milestones:

FY 2016–2020:

- Issue a FY 2016 Federal Funding Opportunity through Grants.gov soliciting proposals for Pacific salmon recovery from states and tribes from the Pacific Coast region
- Maintain emphasis on riparian habitat restoration and protection within the 1st PCSRF program priority, as initiated in the FY 2015 Federal Funding Opportunity
- Conduct outreach with grantees regarding identified priority areas for riparian habitat restoration and protection
- Update NOAA's salmonid recovery plans to incorporate guidance on priority areas and actions for riparian habitat restoration and protection
- Review Pacific salmon recovery proposals per the NOAA program priorities and evaluation criteria detailed in the Federal Funding Opportunity. Applicant's proposals under PCSRF Program priority #1 must demonstrate that they are addressing the priority recovery actions detailed in NOAA's salmonid recovery plans
- Competitively award Pacific salmon recovery grants to states and tribes from the Pacific region to implement habitat restoration and recovery projects focused on improving the status of salmonid population and their habitats
- Annually review, evaluate, and assess the effectiveness of funded projects and programs to improve species recovery.
- Track progress, measure performance, and ensure accountability in the use of PCSRF funds

Deliverables:

FY 2016–2020:

- Enhanced availability of salmonid habitat
- Improved quality of salmon habitat
- Implementation of projects targeting the factors limiting the recovery of ESA-listed salmonids, with an emphasis on riparian habitat restoration and protection
- Continued tracking of the collective effectiveness of PCSRF and other recovery

Paper Number 24, Spring 2010.

⁴⁰ Hibbard, M. and S. Lurie. 2006. Some community socio-economic benefits of watershed councils: A case study from Oregon. *Journal of Environmental Planning and Management* 49:891-908

programs through the monitoring of population status and trends and the intensive monitoring of the ecological conditions in sentinel watersheds

Performance Goals and Measurement Data:

Performance Measure:	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
Number of Habitat Acres Restored (Annually) (Measure 3.4f)	29,407 ¹	32,460	45,500	46,800	48,000	48,000	48,000
Habitat Acres	8,038	8,445	4,500	5,800	6,000	6,000	6,000
ARRA Acres ²	1,316	1,015	0	0	0	0	0
PCSRF acres ³	20,103	23,000	41,000	41,000	42,000	42,000	42,000
Overlap ⁴	-50	--	--	--	--	--	--

Description: NOAA restores habitat areas lost or degraded as a result of development and other human activities, as well as specific pollution incidents and sources. Activities are geared toward NOAA trust resources found across the marine environment, including the Great Lakes region, and are supportive of anadromous fish species. The intent of this measure is to summarize or project the geographic area over which ecosystem function has been or will be improved as the direct result of habitat restoration efforts. This measure does not include restoration conducted through Natural Resource Damage Assessments or the Species Recovery Grants.

1. Number of acres shown for FY 2014 actuals reflect total acres reported. Total acres reported takes into account joint acres i.e., acres restored that have been supported and reported by both Habitat and PCSRF for the same project but not necessarily the same activity. For example, Habitat may fund the engineering phase of a project and PCSRF may fund the construction phase. Consequently, the total reported is less than the sum of Habitat, ARRA, and PCSRF acres to account for double counting. In FY 2014 there were 50 joint acres reported.

2. American Recovery and Reinvestment Act (ARRA)

3. PCSRF FY 2015 targets represent the expected acres restored from funded projects with an anticipated completion date within the respective fiscal years. FY 2016 through FY 2020 targets are based on formula projections of acres restored based on program appropriations and past program performance.

4. Represents the overlap in habitat acres restored due to jointly funded PCSRF and NOAA Restoration Center projects. These "overlap" acres are include in the PCSRF and Habitat totals, respectively, but deducted from the total number of NOAA habitat acres restored.

Performance Measure:	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
Stream miles made accessible	594 ¹	825	570	570	580	580	580
Habitat stream miles	194	225	130	130	130	130	130
ARRA stream miles ²	9	50	0	0	0	0	0
PCSRF stream miles ³	442	550	440	440	450	450	450
Overlap ⁴	-51	--	--	--	--	--	--

Description: This performance measure counts stream miles made accessible as a result of Habitat Program activities. Stream miles made accessible in this context will include barrier removal and fish passage projects that support recovery of listed species.

1. Number of stream miles shown for FY 2014 actuals reflect total stream miles reported. Total stream miles reported takes into account joint stream mile i.e., stream miles made accessible through projects funded by both Habitat and PCSRF for the same project but not necessarily the same activity. For example, Habitat may fund the removal of a passage-blocking culvert at a road crossing, and PCSRF may fund the construction of a bridge to replace the removed culvert. Consequently, the total reported is less than the sum of Habitat, ARRA, and PCSRF stream miles to account for double counting. In FY 2014 there were 51 joint stream miles reported.

2. American Recovery and Reinvestment Act (ARRA)

3. PCSRF FY 2015 targets represent the expected stream miles made accessible from funded projects with an anticipated completion date within the respective fiscal years. FY 2016 through FY 2020 targets are based on formula projections of stream miles based on program appropriations and past program performance.

4. Represents the overlap in stream miles due to jointly funded PCSRF and NOAA Restoration Center projects. These "overlap" stream miles are include in the PCSRF and Habitat totals, respectively, but deducted from the total number of NOAA stream miles made accessible.

PROGRAM CHANGES FOR FY 2016:

Pacific Coastal Salmon Recovery Fund (PCSRF): (Base Funding: \$65,000,000 and 2 FTE: Program Change: -\$7,000,000 and 0 FTE): NOAA requests a decrease of \$7,000,000 and 0 FTE for a total of \$58,000,000 and 2 FTE for the Pacific Coastal Salmon Recovery Fund (PCSRF).

Proposed Actions:

The FY 2016 request of \$58.0 million for PCSRF will maintain a significant level of investment in habitat protection and restoration in support of recovering Pacific salmonid (i.e., salmon and steelhead) populations listed under the Endangered Species Act (ESA), as well as sustaining listed and non-listed salmonid populations to uphold our tribal treaty obligations. The PCSRF remains an essential tool for achieving these goals. Given the over \$1.0 billion Federal investment made since 2000 toward Pacific salmonid recovery and the significant community support for these efforts, the program can continue to make critical progress toward recovery with this request. PCSRF-funded efforts will be coordinated with other NOAA programs such as Mitchell Act, Pacific Salmon Treaty, NOAA Restoration Center's Community Based Restoration Program, and Species Recovery Grants. These NOAA programs will continue to be administered in close coordination to realize efficiencies; identify strategic opportunities; ensure complementary implementation in the furtherance of the respective goals of the programs; and, to achieve significant conservation benefits on a national scale.

PCSRF activities along the Pacific coast are part of our Federal commitment to salmon and steelhead recovery and tribal treaty fishing rights, and represent a conservation effort that enables tens of billions of dollars of economic activity in these western states. Seventeen Evolutionary Significant Units of Pacific salmon and 11 Distinct Population Segments of steelhead are listed under the ESA. PCSRF funds are used to protect and recover habitat, assist in the planning and design of restoration projects, support research and monitoring efforts, encourage outreach and education with local communities and land owners, implement hatchery reform efforts, implement management strategies that allow for tribal harvest while being protective of at-risk populations, and maintain salmon populations necessary for the exercise of Native American treaty rights and to meet Federal tribal trust obligations.

In 2016, NOAA will continue to ensure that riparian buffer protection and restoration receives priority for funding. NOAA will also continue ongoing collaborative work with the U.S. Department of Agriculture and the U.S. Environmental Protection Agency to jointly identify and target the highest priority salmon habitat restoration areas in the region for federal outreach and funding.

Resource Assessment:

NMFS currently funds projects along the Pacific Coast that contribute to preventing extinction and improving the status of ESA-listed species and their habitats, as well as supporting and protecting healthy populations. Projects range from single-site culvert replacement to hundreds of acres of habitat acquisition and restoration. Additional information on the resources for this activity can be found in the PCSRF narrative.

Schedule and Milestones:

FY 2016–2020

- Issue a FY 2016 *Federal Funding Opportunity* through Grants.gov soliciting proposals for Pacific salmonid recovery from states (i.e., CA, OR, WA, ID, NV, AK) and tribes from the Pacific Coast region
- Maintain emphasis on riparian habitat restoration and protection within the first PCSRF program priority, as initiated in the FY 2015 *Federal Funding Opportunity* notice
- Conduct outreach with grantees regarding identified priority areas for riparian habitat restoration and protection
- Update NOAA's salmonid recovery plans to incorporate guidance on priority areas and actions for riparian habitat restoration and protection. Applicant's proposals under PCSRF Program priority number one must demonstrate that they are addressing these priority recovery actions detailed in NOAA's salmonid recovery plans
- Review Pacific salmonid recovery proposals per the NOAA program priorities and evaluation criteria detailed in the *Federal Funding Opportunity* notice
- Competitively award Pacific salmonid recovery grants to states and tribes from the Pacific Coast region to implement habitat restoration and recovery projects focused on improving the status of salmonid populations and their habitats
- Annually review, evaluate, and assess the effectiveness of funded projects and programs to improve species recovery
- Track progress, measure performance, and ensure accountability in the use of PCSRF funds

Deliverables:

FY 2016–2020

- Enhanced availability of salmonid habitat
- Improved quality of salmonid habitat
- Implementation of projects targeting the factors limiting the recovery of ESA-listed salmonids, with an emphasis on riparian habitat restoration and protection
- Continued tracking of the collective effectiveness of PCSRF and other recovery programs through the monitoring of population status and trends and the intensive monitoring of the ecological conditions in sentinel watersheds

Performance Goals and Measurement Data:

Performance Measure: Number of Habitat Acres Restored (Annually) (Measure 3.4f) (PCSRF only*)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Decrease	N/A	N/A	41,000	41,000	40,000	39,000	37,000
Without Decrease	20,103	23,000	41,000	41,000	42,000	42,000	42,000

Description: NOAA restores habitat areas lost or degraded as a result of development and other human activities, as well as specific pollution incidents and sources. Activities are geared toward NOAA trust resources found across the marine environment, including the Great Lakes region, and supportive of anadromous fish species. The intent of this measure is to summarize or project the geographic area over which ecosystem function has been or will be improved as the direct result of habitat restoration efforts. These measures have at least a two-year lag time from the year of appropriation of funds to when projects are accomplished.

** The PCSRF FY 2015 target represents the expected acres restored from funded projects with an anticipated completion date that FY. FY 2016-FY 2020 targets are based on formula projections of acres restored based on program appropriations and past program performance. These FY 2016-FY 2020 out-year targets represent accomplishments with funding from prior years. The PCSRF awards 5-year grants, and in developing the out-year targets NMFS assumes 2 years of project "ramp-up" (e.g., project selection, design, permitting, and implementation), with the performance accomplishments being achieved and reported in years 3-5. Out-year target setting is based on average acres restored in previous years, without regard to trends in cost per acre. NMFS is now seeing a trend toward higher per-acre costs resulting in smaller and more expensive projects, which impacts future targets.*

Performance Measure: Number of Stream Miles Made Accessible (Annually) (PCSRF Only*)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Decrease	N/A	N/A	440	440	430	420	400
Without Decrease	442	550	440	440	450	450	450

Description: NOAA restores access to habitat areas for anadromous fish species that have been blocked by human activities (e.g., road development, culverts, irrigation diversions, dams. The intent of this measure is to summarize or project the stream miles of habitat that have been made accessible through funded passage improvement projects. These measures have at least a two-year lag time from the year of appropriation of funds to when projects are accomplished.

** The PCSRF FY 2015 target represents the expected stream miles made accessible from funded projects with an anticipated completion date within that FY. FY 2016-FY 2020 targets are based on formula projections of stream miles made accessible based on program appropriations and past program performance. These FY 2016-FY 2020 out-year targets represent accomplishments with funding from prior years. The PCSRF awards 5-year grants, and in developing the out-year targets NMFS assumes 2 years of project "ramp-up" (e.g., project selection, design, permitting, and implementation), with the performance accomplishments being achieved and reported in years 3-5. Out-year target setting is based on average stream miles made accessible in previous years, without regard to trends in this performance measure. NMFS is now seeing a trend toward higher per-project costs resulting in smaller and more expensive projects, which impacts future targets.*

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: National Marine Fisheries Service
Sub-Program: Pacific Coastal Salmon Recovery Fund
Program Change: Pacific Coastal Salmon Recovery Fund

Object Class		FY 2016 Decrease	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$204
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.7	Special personnel services payments	0	0
11.9	Total personnel compensation	0	204
12	Civilian personnel benefits	0	63
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	1
22	Transportation of things	0	0
23.1	Rental payments to GSA	0	0
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and miscellaneous charges	0	0
24	Printing and reproduction	0	0
25.1	Advisory and assistance services	0	0
25.2	Other services	0	0
25.3	Purchases of goods & services from Gov't accounts	0	328
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	0
31	Equipment	0	0
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	(7,000)	57,404
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	(7,000)	58,000

Department of Commerce
 National Oceanic and Atmospheric Administration
 Pacific Coastal Salmon Recovery
SUMMARY OF RESOURCE REQUIREMENTS
 (Dollar amounts in thousands)

	Positions	FTE	Budget Authority	Direct Obligations
FY 2015 Currently Available	2	2	65,000	65,001
less: Prior year obligations	0	0	0	(1)
plus: Other Adjustments-to-Base	0	0	0	0
FY 2016 Base	2	2	65,000	65,000
plus: 2016 Program Changes	0	0	(7,000)	(7,000)
FY 2016 Estimate	2	2	58,000	58,000

		FY 2014 Actuals		FY 2015 Currently Available		FY 2016 Base Program		FY 2016 Estimate		Increase/ (Decrease)	
		Personnel Amount		Personnel Amount		Personnel Amount		Personnel Amount		Personnel Amount	
Pacific Coastal Salmon Recovery Account	Pos/BA	3	64,935	2	65,000	2	65,000	2	58,000	0	(7,000)
	FTE/OBL	3	64,960	2	65,001	2	65,000	2	58,000	0	(7,000)
Total: Pacific Coastal Salmon Recovery Account	Pos/BA	3	64,935	2	65,000	2	65,000	2	58,000	0	(7,000)
	FTE/OBL	3	64,960	2	65,001	2	65,000	2	58,000	0	(7,000)

Department of Commerce
National Oceanic and Atmospheric Administration
Pacific Coastal Salmon Recovery
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

	FY 2014 Actuals		FY 2015 Currently Available		FY 2016 Base Program		FY 2016 Estimate		Increase/ (Decrease)	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Direct Discretionary Obligation	3	64,960	2	65,001	2	65,000	2	58,000	0	(7,000)
Total Obligations	3	64,960	2	65,001	2	65,000	2	58,000	0	(7,000)
Adjustments to Obligations:										
Unobligated balance, expired	0	0	0	713	0	0	0	0	0	0
Recoveries	0	(505)	0	0	0	0	0	0	0	0
Unobligated balance, adj. SOY	0	(234)	0	(714)	0	0	0	0	0	0
Unobligated balance, adj. EOY	0	714	0	0	0	0	0	0	0	0
Total Budget Authority	3	64,935	2	65,000	2	65,000	2	58,000	0	(7,000)
Financing from Transfers and Other:										
Permanently Reduced	0	0	0	0	0	0	0	0	0	0
Transfer to ORF	0	65	0	0	0	0	0	0	0	0
Net Appropriation	3	65,000	2	65,000	2	65,000	2	58,000	0	(7,000)

Department of Commerce
National Oceanic and Atmospheric Administration
Pacific Coastal Salmon Recovery
SUMMARY OF REQUIREMENTS BY OBJECT CLASS
(Dollar amounts in thousands)

Object Class	FY 2014 Actuals	FY 2015 Currently Available	FY 2016 Base	FY 2016 Estimate	Increase/ (Decrease)
11 Personnel compensation					
11.1 Full-time permanent	315	315	315	315	0
11.3 Other than full-time permanent	0	0	0	0	0
11.5 Other personnel compensation	0	0	0	0	0
11.8 Special personnel services payments	0	0	0	0	0
11.9 Total personnel compensation	315	315	315	315	0
12.1 Civilian personnel benefits	100	100	100	100	0
13 Benefits for former personnel	0	0	0	0	0
21 Travel and transportation of persons	1	15	15	15	0
22 Transportation of things	0	0	0	0	0
23.1 Rental payments to GSA	0	0	0	0	0
23.2 Rental payments to others	0	0	0	0	0
23.3 Commun., util., misc. charges	0	0	0	0	0
24 Printing and reproduction	0	0	0	0	0
25.2 Other services	336	336	336	336	0
26 Supplies and materials	0	0	0	0	0
31 Equipment	0	0	0	0	0
32 Lands and structures	0	0	0	0	0
33 Investments and loans	0	0	0	0	0
41 Grants, subsidies and contributions	64,208	64,235	64,234	57,234	(7,000)
42 Insurance claims and indemnities	0	0	0	0	0
43 Interest and dividends	0	0	0	0	0
44 Refunds	0	0	0	0	0
99 Total Obligations	64,960	65,001	65,000	58,000	(7,000)

Department of Commerce
National Oceanic and Atmospheric Administration
Pacific Coastal Salmon Recovery
SUMMARY OF REQUIREMENTS BY OBJECT CLASS
(Dollar amounts in thousands)

Less prior year recoveries	(505)	0	0	0	0
Less unobligated balance, SOY	(234)	(714)	0	0	0
Plus unobligated balance, EOY	714	0	0	0	0
Unobligated Balance, expired	0	713	0	0	0
Total Budget Authority	64,935	65,001	65,000	58,000	(7,000)

APPROPRIATION ACCOUNT: FISHERMEN'S CONTINGENCY FUND

For FY 2016, NMFS requests a total of \$350,000 for the Fishermen's Contingency Fund.

JUSTIFICATION FOR FY 2016:

The Fishermen's Contingency Fund is authorized under Section 402 of Title IV of the Outer Continental Shelf Lands Act Amendments of 1978. NOAA compensates U.S. commercial fishermen for damage or loss of fishing gear, vessels, and resulting economic loss caused by obstructions related to oil and gas exploration, development, and production in any area of the Outer Continental Shelf. The funds used to provide this compensation are derived from fees collected on an annual basis by the Secretary of the Interior from the holders of leases, exploration permits, easements, or rights-of-way in areas of the Outer Continental Shelf.

This activity is funded totally through user fees. Disbursements can be made only to the extent authorized in appropriation acts.

PROPOSED LEGISLATION:

For carrying out the provisions of Title IV of Public Law 95-372, not to exceed \$350,000, to be derived from receipts collected pursuant to that Act, to remain available until expended.

PROGRAM CHANGE FOR FY 2016:

No program change is requested for this account.

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Department of Commerce
 National Oceanic and Atmospheric Administration
 Fishermen's Contingency Fund
SUMMARY OF RESOURCE REQUIREMENTS
 (Dollar amounts in thousands)

	Positions	FTE	Budget Authority	Direct Obligations
FY 2015 Currently Available	0	0	350	832
plus: Obligations from prior year balances	0	0	0	(482)
plus: Other Adjustments-to-Base	0	0	0	0
FY 2016 Base	0	0	350	350
plus: 2016 Program Changes	0	0	0	0
FY 2016 Estimate	0	0	350	350

		FY 2014 Actuals		FY 2015 Currently Available		FY 2016 Base Program		FY 2016 Estimate		Increase/ (Decrease)	
		Personnel Amount		Personnel Amount		Personnel Amount		Personnel Amount		Personnel Amount	
Fishermen's Contingency Fund	Pos/BA	0	350	0	350	0	350	0	350	0	0
	FTE/OBL	0	172	0	832	0	350	0	350	0	0
Total: Fishermen's Contingency Fund	Pos/BA	0	350	0	350	0	350	0	350	0	0
	FTE/OBL	0	172	0	832	0	350	0	350	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Fishermen's Contingency Fund
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

	FY 2014 Actuals		FY 2015 Currently Available		FY 2016 Base Program		FY 2016 Estimate		Increase/ (Decrease)	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Direct Discretionary Obligation	0	172	0	832	0	350	0	350	0	0
Total Obligations	0	172	0	832	0	350	0	350	0	0
Adjustments to Obligations:										
Unobligated balance, adj. SOY	0	(279)	0	(482)	0	0	0	0	0	0
Unobligated balance, EOY	0	482	0	0	0	0	0	0	0	0
Total Budget Authority	0	375	0	350	0	350	0	350	0	0
Financing from Transfers and Other:										
Temporarily Reduced	0	0	0	0	0	0	0	0	0	0
Unapportioned	0	(25)	0	0	0	0	0	0	0	0
Discretionary Appropriation	0	0	0	0	0	0	0	0	0	0
Net Appropriation	0	350	0	350	0	350	0	350	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Fishermen's Contingency Fund
SUMMARY OF REQUIREMENTS BY OBJECT CLASS
(Dollar amounts in thousands)

Object Class	FY 2014 Actuals	FY 2015 Currently Available	FY 2016 Base	FY 2016 Estimate	Increase/ (Decrease) over 2016 Base
11 Personnel compensation					
11.1 Full-time permanent	0	0	0	0	0
11.3 Other than full-time permanent	0	0	0	0	0
11.5 Other personnel compensation	0	0	0	0	0
11.8 Special personnel services payments	0	0	0	0	0
11.9 Total personnel compensation	0	0	0	0	0
12.1 Civilian personnel benefits	0	0	0	0	0
13 Benefits for former personnel	0	0	0	0	0
21 Travel and transportation of persons	0	0	0	0	0
22 Transportation of things	0	0	0	0	0
23.1 Rental payments to GSA	0	0	0	0	0
23.2 Rental payments to others	0	0	0	0	0
23.3 Commun., util., misc. charges	0	0	0	0	0
24 Printing and reproduction	0	0	0	0	0
Other					
25.2 services	0	0	0	0	0
26 Supplies and materials	0	0	0	0	0
31 Equipment	0	0	0	0	0
32 Lands and structures	0	0	0	0	0
33 Investments and loans	0	0	0	0	0
41 Grants, subsidies and contributions	0	0	0	0	0
42 Insurance claims and indemnities	172	832	350	350	0
43 Interest and dividends	0	0	0	0	0
44 Refunds	0	0	0	0	0
99 Total Obligations	172	832	350	350	0

Department of Commerce
 National Oceanic and Atmospheric Administration
 Fishermen's Contingency Fund
SUMMARY OF REQUIREMENTS BY OBJECT CLASS
 (Dollar amounts in thousands)

Less prior year recoveries	0	0	0	0	0
Less unobligated balance, SOY	(279)	(482)	0	0	0
Less unapportioned	(25)	0	0	0	0
Plus unobligated balance, EOY	482	0	0	0	0
Unobligated balance, rescission	0	0	0	0	0
Total Budget Authority	350	350	350	350	0

APPROPRIATION ACCOUNT: FOREIGN FISHING OBSERVER FUND

For FY 2016, NMFS requests a total of \$0 for the Foreign Fishing Observer Fund.

JUSTIFICATION FOR FY 2016:

The Foreign Fishing Observer Fund is financed through fees collected from owners and operators of foreign fishing vessels fishing within the U.S. EEZ (such fishing requires a permit issued under the Magnuson-Stevens Act). This includes longline vessels fishing in the Atlantic billfish and shark fishery and other foreign vessels fishing in the EEZ. The fund is used by NOAA to pay salaries, administrative costs, data editing and entry costs, and other costs incurred in placing observers aboard foreign fishing vessels. The observer program is conducted primarily through contracts with the private sector. NOAA/NMFS places these observers aboard foreign fishing vessels to monitor compliance with U.S. fishery laws and to collect fishery management data. Amounts available in the fund can be disbursed only to the extent and in amounts provided in appropriation acts. In FY 1985 Congress approved the establishment of a supplemental observer program. The program provided that foreign vessels without federally funded observers are required to obtain the services of private contractors certified by the Secretary of Commerce.

PROGRAM CHANGE FOR FY 2016:

No program change is requested for this account.

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Department of Commerce
 National Oceanic and Atmospheric Administration
 Foreign Fishing Observer Fund
SUMMARY OF RESOURCE REQUIREMENTS
 (Dollar amounts in thousands)

	Positions	FTE	Budget Authority	Direct Obligations
FY 2015 Currently Available	0	0	0	0
less: Obligations from prior year balances	0	0	0	0
Plus: 2016 Adjustments to Base			0	
FY 2016 Base	0	0	0	0
plus: 2016 Program Changes	0	0	0	0
FY 2016 Estimate	0	0	0	0

Comparison by activity/subactivity		FY 2014 Actuals		FY 2015 Currently Available		FY 2016 Base Program		FY 2016 Estimate		Increase/ (Decrease)	
		Personnel Amount	Personnel Amount	Personnel Amount	Personnel Amount	Personnel Amount	Personnel Amount	Personnel Amount	Personnel Amount		
Foreign Fishing Observer Fund	Pos/BA	0	0	0	0	0	0	0	0	0	0
	FTE/OBL	0	0	0	0	0	0	0	0	0	0
Total: Foreign Fishing Observer Fund	Pos/BA	0	0	0	0	0	0	0	0	0	0
	FTE/OBL	0	0	0	0	0	0	0	0	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Foreign Fishing Observer Fund
SUMMARY OF Financing
(Dollar amounts in thousands)

	FY 2014 Actuals		FY 2015 Currently Available		FY 2016 Base Program		FY 2016 Estimate		Increase/ (Decrease)	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Direct Discretionary Obligation	0	0	0	0	0	0	0	0	0	0
Total Obligations	0	0	0	0	0	0	0	0	0	0
Adjustments to Obligations:										
Unobligated balance, adj. SOY	0	(522)	0	(522)	0	(522)	0	(522)	0	0
Unobligated balance, EOY	0	522	0	522	0	522	0	522	0	0
Total Budget Authority	0	0	0	0	0	0	0	0	0	0
Financing from Transfers and Other:										
Unobligated balance, rescission	0	0	0	0	0	0	0	0	0	0
Net Appropriation	0	0	0	0	0	0	0	0	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Foreign Fishing Observer Fund
SUMMARY OF REQUIREMENTS BY OBJECT CLASS
(Dollar amounts in thousands)

Object Class	FY 2014 Actuals	FY 2015 Currently Available	FY 2016 Base	FY 2016 Estimate	Increase/ (Decrease)
11 Personnel compensation					
11.1 Full-time permanent	0	0	0	0	0
11.3 Other than full-time permanent	0	0	0	0	0
11.5 Other personnel compensation	0	0	0	0	0
11.8 Special personnel services payments	0	0	0	0	0
11.9 Total personnel compensation	0	0	0	0	0
12.1 Civilian personnel benefits	0	0	0	0	0
13 Benefits for former personnel	0	0	0	0	0
21 Travel and transportation of persons	0	0	0	0	0
22 Transportation of things	0	0	0	0	0
23.1 Rental payments to GSA	0	0	0	0	0
23.2 Rental payments to others	0	0	0	0	0
23.3 Commun., util., misc. charges	0	0	0	0	0
24 Printing and reproduction	0	0	0	0	0
25.2 Other services	0	0	0	0	0
26 Supplies and materials	0	0	0	0	0
31 Equipment	0	0	0	0	0
32 Lands and structures	0	0	0	0	0
33 Investments and loans	0	0	0	0	0
41 Grants, subsidies and contributions	0	0	0	0	0
42 Insurance claims and indemnities	0	0	0	0	0
43 Interest and dividends	0	0	0	0	0
44 Refunds	0	0	0	0	0
99 Total Obligations	0	0	0	0	0

Department of Commerce
 National Oceanic and Atmospheric Administration
 Foreign Fishing Observer Fund
SUMMARY OF REQUIREMENTS BY OBJECT CLASS
 (Dollar amounts in thousands)

Less prior year recoveries	0	0	0	0	0
Less unobligated balance, SOY	(522)	(522)	(522)	(522)	0
Plus unobligated balance, EOY	522	522	522	522	0
Unobligated balance, rescission	0	0	0	0	0
Total Budget Authority	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>

APPROPRIATION ACCOUNT: FISHERIES FINANCE PROGRAM ACCOUNT

For FY 2016, NMFS requests a total of \$10,300,000 for the Fisheries Finance Program Account.

JUSTIFICATION FOR FY 2016:

The Fisheries Finance Program (FFP) is a national loan program that makes long-term fixed-rate financing available to U.S. citizens who otherwise qualify for financing or refinancing of the construction, reconstruction, reconditioning, and, in some cases, the purchasing of fishing vessels, shoreside processing, aquaculture, mariculture facilities, and the purchase of individual fishing quota (IFQ). The purpose of these loans is to provide stability to at least one aspect of an otherwise volatile industry. The FFP also provides fishery-wide financing to ease the transition to sustainable fisheries through its fishing capacity reduction programs and provides financial assistance in the form of loans to fishermen who fish from small vessels and entry-level fishermen to promote stability and reduce consolidation in already rationalized fisheries. Additionally, FFP can provide loans for fisheries investments of Native American Community Development Quota (CDQ) groups.

The FFP operates under the authority of Title XI of the Merchant Marine Act of 1936, as amended (46 USC 53701); Section 303(a) of the Sustainable Fisheries Act amendments to the Magnuson-Stevens Act; and, from time to time FFP-specific legislation. FFP lending practices are guided by Title XI, general rules implementing Title XI (found at 50 CFR part 253, subpart B), NOAA's sustainable fisheries policy, and the practical considerations of a program that has continually not required an appropriation of loan loss subsidy under the Federal Credit Reform Act, as discussed below. The overriding guideline for all FFP financings is that they cannot contribute or be construed to contribute to an increase in existing fishing capacity.

All FFP authority is subject to the Federal Credit Reform Act of 1990 (FCRA) (2 U.S.C. 661) which requires the estimated loan losses (FCRA cost) be appropriated in cash at the time Congress authorizes annual credit ceilings. Some types of FFP loans require no FCRA subsidy appropriations because these types of loans have historically not required additional loan subsidy. However, specific loan ceilings for each type of loan authority must be included in appropriation language or other bill language regardless of the need for cash appropriations.

PROPOSED LEGISLATION:

Subject to section 502 of the Congressional Budget Act of 1974, during fiscal year 2016, obligations of direct loans may not exceed \$24,000,000 for Individual Fishing Quota loans and not to exceed \$100,000,000 for traditional direct loans as authorized by the Merchant Marine Act of 1936. In addition, \$10,300,000 is provided to implement Section 3095 of the National Defense Authorization Act of 2015, of which \$300,000 is for subsidy cost to refinance the loan.

PROGRAM CHANGE FOR FY 2016:

As required under Section 3095 of the 2015 National Defense Authorization Act and Section 504(b) of the Federal Credit Reform Act (FCRA), the Budget requests \$10,000,000 to cover the estimated loss to the government from the reduced payments received under the new loan terms compared with the current payments for the Pacific Coast Groundfish Fishing Capacity Reduction Loan. The Budget also requests \$300,000 for the subsidy cost to refinance the loan of up to \$30,000,000 for a total of \$10,300,000 in FY 2016.

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: National Marine Fisheries Service
Sub-Program: Fisheries Finance Program Account
Program Change: Fisheries Finance Program Account

Object Class	FY 2016 Increase	FY 2016 Total Program
11 Personnel compensation		
11.1 Full-time permanent	\$0	\$0
11.3 Other than full-time permanent	0	0
11.5 Other personnel compensation	0	0
11.7 Special personnel services payments	0	0
11.9 Total personnel compensation	0	0
12 Civilian personnel benefits	0	
13 Benefits for former personnel	0	0
21 Travel and transportation of persons	0	0
22 Transportation of things	0	0
23.1 Rental payments to GSA	0	0
23.2 Rental Payments to others	0	0
23.3 Communications, utilities and miscellaneous charges	0	0
24 Printing and reproduction	0	0
25.1 Advisory and assistance services	0	0
25.2 Other services	0	0
25.3 Purchases of goods & services from Gov't accounts	0	0
25.4 Operation and maintenance of facilities	0	0
25.5 Research and development contracts	0	0
25.6 Medical care	0	0
25.7 Operation and maintenance of equipment	0	0
25.8 Subsistence and support of persons	0	0
26 Supplies and materials	0	0
31 Equipment	0	0
32 Lands and structures	0	0
33 Investments and loans	0	0
41 Grants, subsidies and contributions	10,300	10,300
42 Insurance claims and indemnities	0	0
43 Interest and dividends	0	0
44 Refunds	0	0
99 Total obligations	10,300	10,300

Department of Commerce
 National Oceanic and Atmospheric Administration
 Fisheries Finance Program Account
SUMMARY OF RESOURCE REQUIREMENTS
 (Dollar amounts in thousands)

	Positions	FTE	Budget Authority	Direct Obligations
FY 2015 Currently Available	0	0	22,757	22,757
less: 2016 Adjustments to Base	0	0	(22,757)	(22,757)
less: Negative Subsidy Receipts Adjustment	0	0	0	0
FY 2016 Base	0	0	0	0
plus: 2016 Program Changes	0	0	10,300	10,300
FY 2016 Estimate	0	0	10,300	10,300

Comparison by activity/subactivity		FY 2014 Actuals		FY 2015 Currently Available		FY 2016 Base Program		FY 2016 Estimate		Increase/ Decrease	
		Personnel	Amount	Personnel Amount	Personnel Amount	Personnel Amount	Personnel Amount	Personnel	Amount		
Fisheries Finance Program Account	Pos/BA	0	14,629	0	22,757	0	0	0	10,300	0	10,300
	FTE/OBL	0	14,629	0	22,757	0	0	0	10,300	0	10,300
Total: Fisheries Finance Program Account	Pos/BA	0	14,629	0	22,757	0	0	0	10,300	0	10,300
	FTE/OBL	0	14,629	0	22,757	0	0	0	10,300	0	10,300

Department of Commerce
National Oceanic and Atmospheric Administration
Fisheries Finance Program Account
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

	FY 2014 Actuals		FY 2015 Currently Available		FY 2016 Base Program		FY 2016 Estimate		Increase/ (Decrease)	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Cost Loan Subsidy	0	0	0	0	0	0	0	10,300	0	10,300
Credit Reestimates	0	14,629	0	22,757	0	0	0	0	0	0
Total Obligations	0	14,629	0	22,757	0	0	0	10,300	0	10,300
Adjustments to Obligations:										
Unobligated balance, adj. SOY	0	(2,779)	0	(2,779)	0	(2,779)	0	(2,779)	0	0
Unobligated balance, EOY	0	2,779	0	2,779	0	2,779	0	2,779	0	0
Total Budget Authority	0	14,629	0	22,757	0	0	0	10,300	0	10,300
Financing from Transfers and Other:										
Less: Permanent Indefinite Authority (Mandatory)	0	0	0	0	0	0	0	0	0	0
Net Appropriation	0	14,629	0	22,757	0	0	0	10,300	0	10,300

Department of Commerce
National Oceanic and Atmospheric Administration
Fisheries Finance Program Account
SUMMARY OF REQUIREMENTS BY OBJECT CLASS
(Dollar amounts in thousands)

Object Class	FY 2014 Actuals	FY 2015 Currently Available	FY 2016 Base	FY 2016 Estimate	Increase/ (Decrease)
11 Personnel compensation					
11.1 Full-time permanent	0	0	0	0	0
11.3 Other than full-time permanent	0	0	0	0	0
11.5 Other personnel compensation	0	0	0	0	0
11.8 Special personnel services payments	0	0	0	0	0
11.9 Total personnel compensation	0	0	0	0	0
12.1 Civilian personnel benefits	0	0	0	0	0
13 Benefits for former personnel	0	0	0	0	0
21 Travel and transportation of persons	0	0	0	0	0
22 Transportation of things	0	0	0	0	0
23.1 Rental payments to GSA	0	0	0	0	0
23.2 Rental payments to others	0	0	0	0	0
23.3 Commun., util., misc. charges	0	0	0	0	0
24 Printing and reproduction	0	0	0	0	0
25.2 Other services	0	0	0	0	0
26 Supplies and materials	0	0	0	0	0
31 Equipment	0	0	0	0	0
32 Lands and structures	0	0	0	0	0
33 Investments and loans	0	0	0	0	0
41 Grants, subsidies and contributions	14,629	22,757	0	10,300	10,300
42 Insurance claims and indemnities	0	0	0	0	0
43 Interest and dividends	0	0	0	0	0
44 Refunds	0	0	0	0	0
99 Total Obligations	14,629	22,757	0	10,300	10,300

Department of Commerce
 National Oceanic and Atmospheric Administration
 Fisheries Finance Program Account
SUMMARY OF REQUIREMENTS BY OBJECT CLASS
 (Dollar amounts in thousands)

Less prior year recoveries	0	0	0	0	0
Less unobligated balance, SOY	(2,779)	(2,779)	(2,779)	(2,779)	0
Plus unobligated balance, EOY	2,779	2,779	2,779	2,779	0
Unobligated balance, rescission	0	0	0	0	0
Total Budget Authority	<u>14,629</u>	<u>22,757</u>	<u>0</u>	<u>10,300</u>	<u>10,300</u>

APPROPRIATION ACCOUNT: PROMOTE AND DEVELOP FISHERIES PRODUCTS

For FY 2016, NMFS requests a total of \$13,574,031 for the Saltonstall-Kennedy Grant Program. NMFS estimates that a total of \$143,738,031 will be transferred from the Department of Agriculture to the Promote and Develop Account and that \$130,164,000 will be transferred from the Promote and Develop account to the Operations, Research and Facilities (ORF) account.

JUSTIFICATION FOR FY 2016:

The American Fisheries Promotion Act (AFPA) of 1980 amended the Saltonstall-Kennedy (S-K) Act to authorize a grants program for fisheries research and development projects to be carried out with S-K funds. S-K funds are derived from a transfer from the Department of Agriculture to NOAA from duties on imported fisheries products. An amount equal to 30 percent of these duties is made available to NOAA and, subject to appropriation, is available to carry out the purposes of the AFPA. The S-K grants program has provided substantial assistance to address impediments to the management, development, and utilization of the Nation's living marine resources. Each year a *Federal Register* notice is published announcing the program. The annual notice outlines priority areas, such as research on the reduction and/or elimination of bycatch, and aquaculture. The remainder of the Promote and Develop funds transferred is used to offset the appropriation requirements of the ORF account. At the President's Budget request, a transfer to ORF of \$130,164,000 will be allocated to the following activities at the specified level:

Fisheries Data Collections, Surveys, and Assessments	\$ 127,659,000
Regional Councils and Fisheries Commissions	\$ 2,505,000
Total	\$130,164,000

PROGRAM CHANGE FOR FY 2016:

No program change is requested for this account.

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Department of Commerce
 National Oceanic and Atmospheric Administration
 Promote and Develop Fisheries Products
SUMMARY OF RESOURCE REQUIREMENTS
 (Dollar amounts in thousands)

	Positions	FTE	Budget Authority	Direct Obligations
FY 2015 Currently Available	0	0	26,615	33,432
less: Obligations from prior year balances	0	0	0	(6,817)
plus: 2016 Adjustments to Base	0	0	(13,041)	(13,041)
FY 2016 Base	0	0	13,574	13,574
plus: 2016 Program Changes	0	0	0	0
FY 2016 Estimate	0	0	13,574	13,574

Comparison by activity/subactivity		FY 2014 Actuals		FY 2015 Currently Available		FY 2016 Base Program		FY 2016 Estimate		Increase/ (Decrease) Personnel Amount	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount		
Promote and Develop Fisheries Products	Pos/BA	0	6,402	0	26,615	0	13,574	0	13,574	0	0
	FTE/OB	0	11,098	0	33,432	0	13,574	0	13,574	0	0
	L										
Total: Promote and Develop Fisheries Products	Pos/BA	0	6,402	0	26,615	0	13,574	0	13,574	0	0
	FTE/OB	0	11,098	0	33,432	0	13,574	0	13,574	0	0
	L										

Department of Commerce
National Oceanic and Atmospheric Administration
Promote and Develop Fisheries Products
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

	FY 2014		FY 2015		FY 2016		FY 2016		Increase/ (Decrease)	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Direct Discretionary Obligation	0	11,098	0	33,432	0	13,574	0	13,574	0	0
Total Obligations	0	11,098	0	33,432	0	13,574	0	13,574	0	0
Adjustments to Obligations:										
Unobligated balance, adj. SOY	0	(11,277)	0	(6,817)	0	0	0	0	0	0
Recoveries	0	(236)	0	0	0	0	0	0	0	0
Unobligated balance, adj. EOY	0	6,817	0	0	0	0	0	0	0	0
Total Budget Authority	0	6,402	0	26,615	0	13,574	0	13,574	0	0
Financing from Transfers and Other:										
Transfer from USDA	0	(130,144)	0	(143,738)	0	(143,738)	0	(143,738)	0	0
Appropriations previously unavailable	0	(628)	0	(9,370)	0	(10,493)	0	(10,493)	0	0
Permanently Reduced	0	0	0	0	0	0	0	0	0	0
Temporarily Reduced	0	9,370	0	10,493	0	10,493	0	10,493	0	0
Transfer to ORF	0	115,000	0	116,000	0	130,164	0	130,164	0	0
Net Appropriation	0	0	0	0	0	0	0	0	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Promote and Develop Fisheries Products
SUMMARY OF REQUIREMENTS BY OBJECT CLASS
(Dollar amounts in thousands)

Object Class	FY 2014 Actuals	FY 2015 Currently Available	FY 2016 Base	FY 2016 Estimate	Increase/ (Decrease)
11 Personnel compensation					
11.1 Full-time permanent	0	0	0	0	0
11.3 Other than full-time permanent	0	0	0	0	0
11.5 Other personnel compensation	0	0	0	0	0
11.8 Special personnel services payments	0	0	0	0	0
11.9 Total personnel compensation	0	0	0	0	0
12.1 Civilian personnel benefits	0	0	0	0	0
13 Benefits for former personnel	0	0	0	0	0
21 Travel and transportation of persons	0	0	0	0	0
22 Transportation of things	0	0	0	0	0
23.1 Rental payments to GSA	0	0	0	0	0
23.2 Rental payments to others	0	0	0	0	0
23.3 Commun., util., misc. charges	0	0	0	0	0
24 Printing and reproduction	0	0	0	0	0
25.2 Other services	0	0	0	0	0
26 Supplies and materials	0	0	0	0	0
31 Equipment	0	0	0	0	0
32 Lands and structures	0	0	0	0	0
33 Investments and loans	0	0	0	0	0
41 Grants, subsidies and contributions	11,098	33,432	13,574	13,574	0
42 Insurance claims and indemnities	0	0	0	0	0
43 Interest and dividends	0	0	0	0	0
44 Refunds	0	0	0	0	0
99 Total Obligations	11,098	33,432	13,574	13,574	0

Department of Commerce
 National Oceanic and Atmospheric Administration
 Promote and Develop Fisheries Products
SUMMARY OF REQUIREMENTS BY OBJECT CLASS
 (Dollar amounts in thousands)

Less unobligated balance, SOY	(11,277)	(6,817)	0	0	0
Plus unobligated balance, EOY	6,817	0	0	0	0
Recoveries	(236)	0	0	0	0
Total Budget Authority	6,402	26,615	13,574	13,574	0

APPROPRIATION ACCOUNT: FEDERAL SHIP FINANCING FUND

For FY 2016, NMFS estimates a total of \$0 for the Federal Ship Financing Fund Account.

JUSTIFICATION FOR FY 2016:

The Federal Ship Financing Fund is the liquidating account necessary for the collection of premiums and fees of the loan guarantee portfolio that existed prior to FY 1992. Administrative expenses for management of the loan guarantee portfolio were charged to the Federal Ship Financing Fund prior to the enactment of the Federal Credit Reform Act of 1990. Currently administrative expenses are charged to the Operations, Research, and Facilities (ORF) account.

PROGRAM CHANGE FOR FY 2016:

No program change is requested for this account.

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Department of Commerce
 National Oceanic and Atmospheric Administration
 Federal Ship Financing Fund
SUMMARY OF RESOURCE REQUIREMENTS
 (Dollar amounts in thousands)

	Positions	FTE	Budget Authority	Direct Obligations
FY 2015 Currently Available	0	0	0	0
FY 2016 Base	0	0	0	0
plus: 2016 Program Changes	0	0	0	0
FY 2016 Estimate	0	0	0	0

Comparison by activity/subactivity		FY 2014 Actuals		FY 2015 Currently Available		FY 2016 Base Program		FY 2016 Estimate		Increase/ (Decrease)	
		Personnel Amount	Personnel Amount	Personnel Amount	Personnel Amount	Personnel Amount	Personnel Amount	Personnel Amount	Personnel Amount		
Federal Ship Financing Fund	Pos/BA	0	(146)	0	0	0	0	0	0	0	0
	FTE/OBL	0	0	0	0	0	0	0	0	0	0
Total: Federal Ship Financing Fund	Pos/BA	0	(146)	0	0	0	0	0	0	0	0
	FTE/OBL	0	0	0	0	0	0	0	0	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Federal Ship Financing Fund
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

	FY 2014 Actuals		FY 2015 Currently Available		FY 2016 Base Program		FY 2016 Estimate		Increase/ (Decrease)	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Transfer to Treasury (Mandatory)	0	146	0	0	0	0	0	0	0	0
Offsetting collections, mandatory	0	(146)	0	0	0	0	0	0	0	0
Total Obligations	0	0	0	0	0	0	0	0	0	0
Adjustments to Obligations:										
Offsetting Collections	0	(146)	0	0	0	0	0	0	0	0
Unobligated balance, adj. SOY	0	0	0	0	0	0	0	0	0	0
Unobligated balance, adj. EOY	0	0	0	0	0	0	0	0	0	0
Total Budget Authority	0	(146)	0	0	0	0	0	0	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Federal Ship Financing Fund
SUMMARY OF REQUIREMENTS BY OBJECT CLASS
(Dollar amounts in thousands)

Object Class	FY 2014 Actuals	FY 2015 Currently Available	FY 2016 Base	FY 2016 Estimate	Increase/ (Decrease) over 2016 Base
11 Personnel compensation					
11.1 Full-time permanent	0	0	0	0	0
11.3 Other than full-time permanent	0	0	0	0	0
11.5 Other personnel compensation	0	0	0	0	0
11.8 Special personnel services payments	0	0	0	0	0
11.9 Total personnel compensation	0	0	0	0	0
12.1 Civilian personnel benefits	0	0	0	0	0
13 Benefits for former personnel	0	0	0	0	0
21 Travel and transportation of persons	0	0	0	0	0
22 Transportation of things	0	0	0	0	0
23.1 Rental payments to GSA	0	0	0	0	0
23.2 Rental payments to others	0	0	0	0	0
23.3 Commun., util., misc. charges	0	0	0	0	0
24 Printing and reproduction	0	0	0	0	0
25.2 Other services	0	0	0	0	0
26 Supplies and materials	0	0	0	0	0
31 Equipment	0	0	0	0	0
32 Lands and structures	0	0	0	0	0
33 Investments and loans	0	0	0	0	0
41 Grants, subsidies and contributions	0	0	0	0	0
42 Insurance claims and indemnities	0	0	0	0	0
43 Interest and dividends	0	0	0	0	0
44 Refunds	0	0	0	0	0
99 Total Obligations	0	0	0	0	0

Department of Commerce
 National Oceanic and Atmospheric Administration
 Federal Ship Financing Fund
SUMMARY OF REQUIREMENTS BY OBJECT CLASS
 (Dollar amounts in thousands)

Less prior year recoveries	0	0	0	0	0
Less unobligated balance, SOY	0	0	0	0	0
Plus unobligated balance, EOY	0	0	0	0	0
Offsetting Collections	(146)	0	0	0	0
Total Budget Authority	(146)	0	0	0	0

APPROPRIATION ACCOUNT: ENVIRONMENTAL IMPROVEMENT & RESTORATION FUND

For FY 2016, NMFS estimates obligating \$334,000 in the Environmental Improvement and Restoration Fund.

JUSTIFICATION FOR FY 2016:

The Environmental Improvement & Restoration Fund (EIRF) was created by the Department of Interior and Related Agencies Appropriations Act of 1998 for the purpose of carrying out marine research activities in the North Pacific. These funds will provide grants to Federal, state, private or foreign organizations or individuals to conduct research activities on or relating to the fisheries or marine ecosystems in the North Pacific Ocean, Bering Sea, and Arctic Ocean.

PROGRAM CHANGE FOR FY 2016:

No program change is requested for this account.

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Department of Commerce
 National Oceanic and Atmospheric Administration
 Environmental Improvement Restoration Fund
SUMMARY OF RESOURCE REQUIREMENTS
 (Dollar amounts in thousands)

	Positions	FTE	Budget Authority	Direct Obligations
FY 2015 Currently Available			1,311	9,755
less: obligations from prior year balances	0	0	0	(8,988)
plus: 2016 Adjustments to Base	0	0	1,910	(433)
FY 2016 Base	0	0	3,221	334
plus: 2016 Program Changes	0	0	0	0
FY 2016 Estimate	0	0	3,221	334

Comparison by activity/subactivity	FY 2014 Actuals		FY 2015 Currently Available		FY 2016 Base Program		FY 2016 Estimate		Increase/ (Decrease)		
	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	
Environmental Improvement & Restoration Fund	Pos/BA	0	17,688	0	1,311	0	3,221	0	3,221	0	0
	FTE/OBL	0	8,715	0	9,755	0	334	0	334	0	0
Total: Environmental Improvement & Restoration Fund	Pos/BA	0	17,688	0	1,311	0	3,221	0	3,221	0	0
	FTE/OBL	0	8,715	0	9,755	0	334	0	334	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Environmental Improvement Restoration Fund
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

	FY 2014		FY 2015		FY 2016		FY 2016		Increase/ (Decrease)	
	Actuals		Currently Available		Base Program		Estimate		FTE	Amount
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Direct Mandatory Obligation	0	8,715	0	9,755	0	334	0	334	0	0
Total Obligations	0	8,715	0	9,755	0	334	0	334	0	0
Adjustments to Obligations:										
Unobligated balance, adj. SOY	0	(15)	0	(8,988)	0	(544)	0	(544)	0	0
Unobligated balance, EOY	0	8,988	0	544	0	3,431	0	3,431	0	0
Total Budget Authority	0	17,688	0	1,311	0	3,221	0	3,221	0	0
Financing from Transfers and Other:										
Appropriation (special fund)	0	0	0	0	0	0	0	0	0	0
Temporarily Reduced	0	705	0	103	0	250	0	250	0	0
Net Mandatory Appropriation	0	18,393	0	1,414	0	3,471	0	3,471	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Environmental Improvement Restoration Fund
SUMMARY OF REQUIREMENTS BY OBJECT CLASS
(Dollar amounts in thousands)

Object Class	FY 2014 Actuals	FY 2015 Currently Available	FY 2016 Base	FY 2016 Estimate	Increase/ (Decrease)
11 Personnel compensation					
11.1 Full-time permanent	0	0	0	0	0
11.3 Other than full-time permanent	0	0	0	0	0
11.5 Other personnel compensation	0	0	0	0	0
11.8 Special personnel services payments	0	0	0	0	0
11.9 Total personnel compensation	0	0	0	0	0
12.1 Civilian personnel benefits	0	0	0	0	0
13 Benefits for former personnel	0	0	0	0	0
21 Travel and transportation of persons	0	0	0	0	0
22 Transportation of things	0	0	0	0	0
23.1 Rental payments to GSA	0	0	0	0	0
23.2 Rental payments to others	0	0	0	0	0
23.3 Commun., util., misc. charges	0	0	0	0	0
24 Printing and reproduction	0	0	0	0	0
25.2 Other services	0	0	0	0	0
26 Supplies and materials	0	0	0	0	0
31 Equipment	0	0	0	0	0
32 Lands and structures	0	0	0	0	0
33 Investments and loans	0	0	0	0	0
41 Grants, subsidies and contributions	8,715	9,755	334	334	0
42 Insurance claims and indemnities	0	0	0	0	0
43 Interest and dividends	0	0	0	0	0
44 Refunds	0	0	0	0	0
99 Total Obligations	8,715	9,755	334	334	0

Department of Commerce
 National Oceanic and Atmospheric Administration
 Environmental Improvement Restoration Fund
SUMMARY OF REQUIREMENTS BY OBJECT CLASS
 (Dollar amounts in thousands)

Less unobligated balance, SOY	(15)	(8,988)	(544)	(544)	0
Plus unobligated balance, EOY	8,988	544	3,431	3,431	0
Unobligated balance, rescission	0	0	0	0	0
Total Budget Authority	17,688	1,311	3,221	3,221	0

APPROPRIATION ACCOUNT: LIMITED ACCESS SYSTEM ADMINISTRATION

For FY 2016, NMFS estimates obligating \$11,525,000 in the Limited Access System Administration account.

JUSTIFICATION FOR FY 2016:

Under the authority of the Magnuson-Stevens Act Section 304(d)(2)(A), NMFS must collect a fee to recover the incremental costs of management, data collection, and enforcement of Limited Privilege (LAP) programs. Funds collected under this authority are deposited into the "Limited Access System Administrative Fund" (LASAF). Fees shall not exceed three percent of the ex-vessel value of fish harvested under any such program, and shall be collected at either the time of the landing, filing of a landing report, or sale of such fish during a fishing season or in the last quarter of the calendar year in which the fish is harvested. The LASAF shall be available, without appropriation or fiscal year limitation, only for the purposes of administering the central registry system; and administering and implementing the Magnuson-Stevens Act in the fishery in which the fees were collected. Sums in the fund that are not currently needed for these purposes shall be kept on deposit or invested in obligations of, or guaranteed by the U.S. Also, in establishing a LAP program, a Regional Council can consider, and may provide, if appropriate, an auction system or other program to collect royalties for the initial or any subsequent distribution of allocations. If an auction system is developed, revenues from these royalties are deposited in the Limited Access System Administration Fund.

PROGRAM CHANGE FOR FY 2016:

No program change is requested for this account.

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Department of Commerce
 National Oceanic and Atmospheric Administration
 Limited Access System Administration Fund
SUMMARY OF RESOURCE REQUIREMENTS
 (Dollar amounts in thousands)

	Positions	FTE	Budget Authority	Direct Obligations
FY 2015 Currently Available	38	38	11,710	10,893
Adjustments to Base	0	0	(1,437)	632
less: Obligations from Prior Year Balances	0	0	0	0
FY 2016 Base	38	38	10,273	11,525
plus: 2016 Program Changes	0	0	0	0
FY 2016 Estimate	38	38	10,273	11,525

Comparison by activity/subactivity		FY 2014 Actuals		FY 2015 Currently Available		FY 2016 Base Program		FY 2016 Estimate		Increase/ (Decrease)	
		Personnel Amount	Personnel Amount	Personnel Amount	Personnel Amount	Personnel Amount	Personnel Amount	Personnel Amount	Personnel Amount		
Limited Access System Administration Fund	Pos/BA	36	9,177	38	11,710	38	10,273	38	10,273	0	0
	FTE/OBL	36	8,081	38	10,893	38	11,525	38	11,525	0	0
Total: Limited Access System Administration Fund	Pos/BA	36	9,177	38	11,710	38	10,273	38	10,273	0	0
	FTE/OBL	36	8,081	38	10,893	38	11,525	38	11,525	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Limited Access System Administration Fund
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

	FY 2014		FY 2015		FY 2016		FY 2016		Increase/ (Decrease)	
	Actuals		Currently Available		Base Program		Estimate			
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Direct Discretionary Obligation	36	8,081	38	10,893	38	11,525	38	11,525	0	0
Total Obligations	36	8,081	38	10,893	38	11,525	38	11,525	0	0
Adjustments to Obligations:										
Recoveries	0	(45)	0	0	0	0	0	0	0	0
Unobligated balance, adj. SOY	0	(11,355)	0	(12,899)	0	(13,716)	0	(13,716)	0	0
Unobligated balance, transferred	0	(404)	0	0	0	0	0	0	0	0
Unobligated balance, EOY	0	12,899	0	13,716	0	12,464	0	12,464	0	0
Total Budget Authority	36	9,177	38	11,710	38	10,273	38	10,273	0	0
Financing from Transfers and Other:										
Appropriations previously unavailable	0	(340)	0	(720)	0	(865)	0	(865)	0	0
Temporarily Reduced	0	720	0	865	0	741	0	741	0	0
Net Appropriation	36	9,556	38	11,855	38	10,149	38	10,149	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Limited Access System Administration Fund
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

Object Class	FY 2014 Actuals	FY 2015 Currently Available	FY 2016 Base	FY 2016 Estimate	Increase/ (Decrease)
11 Personnel compensation					
11.1 Full-time permanent	3,184	3,446	3,446	3,446	0
11.3 Other than full-time permanent	6	6	6	6	0
11.5 Other personnel compensation	368	458	458	458	0
11.8 Special personnel services payments	0	0	0	0	0
11.9 Total personnel compensation	3,558	3,910	3,910	3,910	0
12.1 Civilian personnel benefits	1,401	1,471	1,471	1,471	0
13 Benefits for former personnel	0	0	0	0	0
21 Travel and transportation of persons	124	155	155	155	0
22 Transportation of things	4	334	334	334	0
23.1 Rental payments to GSA	371	402	402	402	0
23.2 Rental payments to others	2	2	2	2	0
23.3 Commun., util., misc. charges	11	12	12	12	0
24 Printing and reproduction	1	1	1	1	0
25.2 Other services	755	2,653	3,285	3,285	0
26 Supplies and materials	20	59	59	59	0
31 Equipment	30	40	40	40	0
32 Lands and structures	0	0	0	0	0
33 Investments and loans	0	0	0	0	0
41 Grants, subsidies and contributions	1,804	1,854	1,854	1,854	0
42 Insurance claims and indemnities	0	0	0	0	0
43 Interest and dividends	0	0	0	0	0
44 Refunds	0	0	0	0	0
99 Total Obligations	8,081	10,893	11,525	11,525	0

Department of Commerce
National Oceanic and Atmospheric Administration
Limited Access System Administration Fund
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

Recoveries	(45)	0	0	0	0
Less unobligated balance, SOY	(11,355)	(12,899)	(13,716)	(13,716)	0
Unobligated balance, transferred	(404)	0	0	0	0
Plus unobligated balance, EOY	12,899	13,716	12,464	12,464	0
Unobligated balance, rescission	0	0	0	0	0
Total Budget Authority	<u>9,177</u>	<u>11,710</u>	<u>10,273</u>	<u>10,273</u>	<u>0</u>

APPROPRIATION ACCOUNT: MARINE MAMMAL UNUSUAL MORTALITY EVENT FUND

For FY 2016, NMFS estimates obligating \$50,000 from the Marine Mammal Unusual Mortality Event Fund.

JUSTIFICATION FOR FY 2016:

An unusual mortality event (UME) is defined under the Marine Mammal Protection Act (MMPA) as “a stranding that is unexpected; involves a significant die-off of any marine mammal population; and demands immediate response.” In recent years, increased efforts to examine carcasses and live stranded animals have improved the knowledge of mortality rates and causes, allowing a better understanding of population threats and stressors and the ability to determine when a situation is “unusual.” Understanding and investigating marine mammal UMEs is important because they can serve as indicators of ocean health, giving insight into larger environmental issues, which may also have implications for human health.

The Marine Mammal Protection Act Section 405 (16 USC 1421d) establishes the Marine Mammal Unusual Mortality Event Fund and describes its purposes and how donations can be made to the Fund. The Marine Mammal Unusual Mortality Event Fund is an emergency response fund used to help cover expenses incurred by the volunteer Marine Mammal Stranding Network during a UME. Specifically, the fund: “shall be available only for use by the Secretary of Commerce, in consultation with the Secretary of the Interior:

- to compensate persons for special costs incurred in acting in accordance with the contingency plan issued under section 1421c(b) of this title or under the direction of an Onsite Coordinator for an unusual mortality event;
- for reimbursing any stranding network participant for costs incurred in preparing and transporting tissues collected with respect to an unusual mortality event for the Tissue Bank; and,
- for care and maintenance of marine mammal seized under section 1374(c)(2)(D) of this title.”

According to the MMPA, deposits can be made into Fund in the following ways:

- “amounts appropriated to the Fund;
- other amounts appropriated to the Secretary for use with respect to unusual mortality events; and,
- amounts received by the United States in the form of gifts, devises, and bequests under subsection (d) of this section.”

Since UMEs are unpredictable emergency events caused by any number of circumstances (natural or human-caused), it is impossible to anticipate how many UMEs may occur in a given year or how much funding will be needed. From 1991–2014 (past 23 years) NOAA declared 60 UMEs, which averages to 2.6 UMEs per year. The highest number of UMEs declared in a year was 5 (in both 2006 and 2007). The costs associated with UMEs are highly variable and depend on the species involved, location, and equipment/laboratory needs. For example, a UME involving large whales offshore can cost well over \$100,000 in expenses because of the considerable logistical challenges and needs (e.g., ship time or aerial support, number of personnel, safety equipment, etc.). Based on previous experience, NOAA expects to obligate \$50,000 in FY 2016 depending on the severity of the emergencies that year, donations received, and the balance of funds remaining.

To date, Congress has appropriated funding for UMEs on one occasion in 2005. In order to

accept donations from the public, the UME Contingency Fund has been listed on pay.gov. This listing is currently operational, but has not been marketed, pending the finalization of a business plan. The business plan is expected to be completed before FY 2016.

PROGRAM CHANGE FOR FY 2016:

No program change is requested for this account.

Department of Commerce
 National Oceanic and Atmospheric Administration
 Marine Mammal Unusual Mortality Event Fund
SUMMARY OF RESOURCE REQUIREMENTS
 (Dollar amounts in thousands)

	Positions	FTE	Budget Authority	Direct Obligations
FY 2015 Currently Available	0	0	0	23
Adjustments to Base	0	0	0	27
FY 2016 Base	0	0	0	50
plus: 2016 Program Changes	0	0	0	0
FY 2016 Estimate	0	0	0	50

Comparison by activity/subactivity		FY 2014 Actuals		FY 2015 Currently Available		FY 2016 Base Program		FY 2016 Estimate		Increase/ (Decrease)	
		Personnel Amount		Personnel Amount		Personnel Amount		Personnel Amount		Personnel	Amount
Marine Mammal Unusual Mortality Event Fund	Pos/BA	0	1	0	0	0	0	0	0	0	0
	FTE/OBL	0	90	0	23	0	50	0	50	0	0
Total: Marine Mammal Unusual Mortality Event Fund	Pos/BA	0	1	0	0	0	0	0	0	0	0
	FTE/OBL	0	90	0	23	0	50	0	50	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Marine Mammal Unusual Mortality Event Fund
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

	FY 2014 Actuals		FY 2015 Currently Available		FY 2016 Base Program		FY 2016 Estimate		Increase/ (Decrease)	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Direct Discretionary Obligation	0	90	0	23	0	50	0	50	0	0
Total Obligations	0	90	0	23	0	50	0	50	0	0
Adjustments to Obligations:										
Recoveries	0	(1)	0	0	0	0	0	0	0	0
Unobligated balance, adj. SOY	0	(111)	0	(23)	0	0	0	0	0	0
Unobligated balance, transferred	0	0	0	0	0	(50)	0	(50)	0	0
Unobligated balance, EOY	0	23	0	0	0	0	0	0	0	0
Total Budget Authority	0	1	0	0	0	0	0	0	0	0
Financing from Transfers and Other:										
Appropriation previously unavailable	0	-1	0	0	0	0	0	0	0	0
Net Appropriation	0	0	0	0	0	0	0	0	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Marine Mammal Unusual Mortality Event Fund
SUMMARY OF REQUIREMENTS BY OBJECT CLASS
(Dollar amounts in thousands)

Object Class	FY 2014 Actuals	FY 2015 Currently Available	FY 2016 Base	FY 2016 Estimate	Increase/ (Decrease)
11 Personnel compensation					
11.1 Full-time permanent	0	0	0	0	0
11.3 Other than full-time permanent	0	0	0	0	0
11.5 Other personnel compensation	0	0	0	0	0
11.8 Special personnel services payments	0	0	0	0	0
11.9 Total personnel compensation	0	0	0	0	0
12.1 Civilian personnel benefits	0	0	0	0	0
13 Benefits for former personnel	0	0	0	0	0
21 Travel and transportation of persons	0	0	0	0	0
22 Transportation of things	0	0	0	0	0
23.1 Rental payments to GSA	0	0	0	0	0
23.2 Rental payments to others	0	0	0	0	0
23.3 Commun., util., misc. charges	0	0	0	0	0
24 Printing and reproduction	0	0	0	0	0
25.2 Other services	0	0	0	0	0
26 Supplies and materials	0	0	0	0	0
31 Equipment	0	0	0	0	0
32 Lands and structures	0	0	0	0	0
33 Investments and loans	0	0	0	0	0
41 Grants, subsidies and contributions	90	23	50	50	0
42 Insurance claims and indemnities	0	0	0	0	0
43 Interest and dividends	0	0	0	0	0
44 Refunds	0	0	0	0	0
99 Total Obligations	90	23	50	50	0

Department of Commerce
 National Oceanic and Atmospheric Administration
 Marine Mammal Unusual Mortality Event Fund
SUMMARY OF REQUIREMENTS BY OBJECT CLASS
 (Dollar amounts in thousands)

Less prior year recoveries	(1)	0	0	0	0
Less unobligated balance, SOY	(111)	(23)	0	0	0
Plus unobligated balance, EOY	23	0	0	0	0
Unobligated balance, transferred	0	0	(50)	(50)	0
Unobligated balance, rescission	0	0	0	0	0
Total Budget Authority	1	0	0	0	0

APPROPRIATION ACCOUNT: WESTERN PACIFIC SUSTAINABLE FISHERIES FUND

For FY 2016, NMFS estimates obligating \$250,000 in the Western Pacific Sustainable Fisheries Fund.

JUSTIFICATION FOR FY 2016:

Section 204(e) of the 2006 amendments to the Magnuson-Stevens Fishery Conservation and Management Act authorizes the establishment of the Western Pacific Sustainable Fisheries Fund. The purpose of this Fund is to allow foreign fishing within the U.S. Exclusive Economic Zone (EEZ) in the Western Pacific through a Pacific Insular Area Fishery Agreement. Before entering into such an Agreement, the Western Pacific Fishery Management Council must develop a Marine Conservation Plan that provides details on uses for any funds collected by the Secretary of Commerce. Marine Conservation Plans must also be developed by the Governors of the Territories of Guam and American Samoa and of the Commonwealth of the Northern Mariana Islands and approved by the Secretary or designee.

The Western Pacific Sustainable Fisheries Fund serves as a repository for any permit payments received by the Secretary for foreign fishing within the U.S. EEZ around Johnston Atoll, Kingman Reef, Palmyra Atoll, and Jarvis, Howland, Baker and Wake Islands, sometimes known as the Pacific remote island areas (PRIA). Also, in the case of violations by foreign vessels occurring in these areas, amounts received by the Secretary attributable to fines and penalties shall be deposited into the Western Pacific Sustainable Fisheries Fund. Additionally, any funds or contributions received in support of conservation and management objectives under a Marine Conservation Plan for any Pacific Insular Area other than American Samoa, Guam, or the Northern Mariana Islands shall be deposited in the Western Pacific Sustainable Fisheries Fund.

PROGRAM CHANGE FOR FY 2016:

No program change is requested for this account.

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Department of Commerce
 National Oceanic and Atmospheric Administration
 Western Pacific Sustainability Fisheries Fund
SUMMARY OF RESOURCE REQUIREMENTS
 (Dollar amounts in thousands)

	Positions	FTE	Budget Authority	Direct Obligations
FY 2015 Currently Available	0	0	322	322
Adjustments to Base	0	0	(72)	(72)
FY 2016 Base	0	0	250	250
plus: 2016 Program Changes	0	0	0	0
FY 2016 Estimate	0	0	250	250

Comparison by activity/subactivity		FY 2014 Actuals		FY 2015 Currently Available		FY 2016 Base Program		FY 2016 Estimate		Increase/ (Decrease)	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
Western Pacific Sustainability Fisheries Fund	Pos/BA	0	118	0	322	0	250	0	250	0	0
	FTE/OBL	0	2,341	0	322	0	250	0	250	0	0
Total: Western Pacific Sustainability Fisheries Fund	Pos/BA	0	118	0	322	0	250	0	250	0	0
	FTE/OBL	0	2,341	0	322	0	250	0	250	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Western Pacific Sustainability Fisheries Fund
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

	FY 2014 Actuals		FY 2015 Currently Available		FY 2016 Base Program		FY 2016 Estimate		Increase/ (Decrease)	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Direct Discretionary Obligation	0	2,341	0	322	0	250	0	250	0	0
Total Obligations	0	2,341	0	322	0	250	0	250	0	0
Adjustments to Obligations:										
Recoveries	0	(452)	0	0	0	0	0	0	0	0
Unobligated balance, adj. SOY	0	(1,771)	0	0	0	0	0	0	0	0
Unobligated balance, EOY	0	0	0	0	0	0	0	0	0	0
Total Budget Authority	0	118	0	322	0	250	0	250	0	0
Financing from Transfers and Other:										
Appropriation previously unavailable	0	(58)	0	(90)	0	(18)	0	(18)	0	0
Temporarily Reduced	0	90	0	18	0	18	0	18	0	0
Net Appropriation	0	150	0	250	0	250	0	250	0	0

Department of Commerce
 National Oceanic and Atmospheric Administration
 Western Pacific Sustainability Fisheries Fund
SUMMARY OF REQUIREMENTS BY OBJECT CLASS
 (Dollar amounts in thousands)

Object Class	FY 2014 Actuals	FY 2015 Currently Available	FY 2016 Base	FY 2016 Estimate	Increase/ (Decrease)
11 Personnel compensation					
11.1 Full-time permanent	0	0	0	0	0
11.3 Other than full-time permanent	0	0	0	0	0
11.5 Other personnel compensation	0	0	0	0	0
11.8 Special personnel services payments	0	0	0	0	0
11.9 Total personnel compensation	0	0	0	0	0
12.1 Civilian personnel benefits	0	0	0	0	0
13 Benefits for former personnel	0	0	0	0	0
21 Travel and transportation of persons	0	0	0	0	0
22 Transportation of things	0	0	0	0	0
23.1 Rental payments to GSA	0	0	0	0	0
23.2 Rental payments to others	0	0	0	0	0
23.3 Commun., util., misc. charges	0	0	0	0	0
24 Printing and reproduction	0	0	0	0	0
25.2 Other services	0	0	0	0	0
26 Supplies and materials	0	0	0	0	0
31 Equipment	0	0	0	0	0
32 Lands and structures	0	0	0	0	0
33 Investments and loans	0	0	0	0	0
41 Grants, subsidies and contributions	2,341	322	250	250	0
42 Insurance claims and indemnities	0	0	0	0	0
43 Interest and dividends	0	0	0	0	0
44 Refunds	0	0	0	0	0
99 Total Obligations	2,341	322	250	250	0

Department of Commerce
 National Oceanic and Atmospheric Administration
 Western Pacific Sustainability Fisheries Fund
SUMMARY OF REQUIREMENTS BY OBJECT CLASS
 (Dollar amounts in thousands)

Recoveries	(452)	0	0	0	0
Less unobligated balance, SOY	(1,771)	0	0	0	0
Plus unobligated balance, EOY	0	0	0	0	0
Unobligated balance, rescission	0	0	0	0	0
Total Budget Authority	118	322	250	250	0

APPROPRIATION ACCOUNT: FISHERIES ASSET FORFEITURE FUND

For FY 2016, NMFS estimates it will collect \$4,000,000 in fines, penalties, and forfeitures proceeds. NOAA will obligate this amount to support the activities described below.

JUSTIFICATION FOR FY 2016:

Section 311(e)(1) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) authorizes the Secretary of Commerce (Secretary) to pay certain enforcement-related expenses from fines, penalties and forfeiture proceeds received for violations of the Magnuson-Stevens Act, Marine Mammal Protection Act, National Marine Sanctuaries Act, or any other marine resource law enforced by the Secretary. Pursuant to this authority, the NOAA has established a Civil Monetary Penalty/Asset Forfeiture Fund (AFF). Certain fines, penalties and forfeiture proceeds received by NOAA are deposited into this Fund, and subsequently used to pay for certain enforcement-related expenses. When Congress established the AFF it was deemed appropriate to use these proceeds to offset in part the costs of administering the Enforcement program. Expenses funded through this source include: costs directly related to the storage, maintenance, and care of seized fish, vessels, or other property during a civil or criminal proceeding; expenditures related directly to specific investigations and enforcement proceedings such as travel for interviewing witnesses; enforcement-unique information technology infrastructure; and annual interagency agreement and contract costs for the administrative adjudication process, including Administrative Law Judges hired by the Coast Guard.

PROGRAM CHANGE FOR FY 2016:

No program change is requested for this account.

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Department of Commerce
 National Oceanic and Atmospheric Administration
Fisheries Asset Forfeiture Fund
SUMMARY OF RESOURCE REQUIREMENTS
 (Dollar amounts in thousands)

	Positions	FTE	Budget Authority	Direct Obligations
FY 2015 Currently Available	0	0	4,068	4,052
Adjustments to Base			(68)	(52)
less: Obligations from Prior Year Balances	0	0	0	0
FY 2016 Base	0	0	4,000	4,000
plus: 2016 Program Changes	0	0	0	0
FY 2016 Estimate	0	0	4,000	4,000

Comparison by activity/subactivity		FY 2014	FY 2015		FY 2016		FY 2016		Increase/		
		Actuals Personnel Amount	Currently Available Personnel	Currently Available Amount	Base Program Personnel	Base Program Amount	Estimate Personnel	Estimate Amount	(Decrease) Personnel	(Decrease) Amount	
Fisheries Asset Forfeiture Fund	Pos/BA	0	2,490	0	4,068	0	4,000	0	4,000	0	0
	FTE/OBL	0	2,665	0	4,052	0	4,000	0	4,000	0	0
Total: Fisheries Asset Forfeiture Fund	Pos/BA	0	2,490	0	4,068	0	4,000	0	4,000	0	0
	FTE/OBL	0	2,665	0	4,052	0	4,000	0	4,000	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Fisheries Asset Forfeiture Fund
SUMMARY OF REQUIREMENTS BY OBJECT CLASS
(Dollar amounts in thousands)

	FY 2014 Actuals		FY 2015 Currently Available		FY 2016 Base Program		FY 2016 Estimate		Increase/ (Decrease)	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Direct Mandatory Obligation	0	2,665	0	4,052	0	4,000	0	4,000	0	0
Total Obligations	0	2,665	0	4,052	0	4,000	0	4,000	0	0
Adjustments to Obligations:										
Offsetting collections	0	(35)	0	0	0	0	0	0	0	0
Unobligated balance, adj. SOY	0	(11,080)	0	(10,941)	0	(10,957)	0	(10,957)	0	0
Unobligated balance, EOY	0	10,941	0	10,957	0	10,957	0	10,957	0	0
Total Budget Authority	0	2,490	0	4,068	0	4,000	0	4,000	0	0
Financing from Transfers and Other:										
Mandatory Appropriation										
Temporarily Reduced	0	360	0	292	0	292	0	292	0	0
Appropriations previously unavailable	0	(129)	0	(360)	0	(292)	0	(292)	0	0
Transfer from Other Accounts	0	0	0	0	0	0	0	0	0	0
Net Appropriation	0	2,721	0	4,000	0	4,000	0	4,000	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Fisheries Asset Forfeiture Fund
SUMMARY OF REQUIREMENTS BY OBJECT CLASS
(Dollar amounts in thousands)

Object Class	FY 2014 Actuals	FY 2015 Enacted	FY 2016 Base	FY 2016 Estimate	Increase/ (Decrease)
11 Personnel compensation					
11.1 Full-time permanent	0	0	0	0	0
11.3 Other than full-time permanent	0	0	0	0	0
11.5 Other personnel compensation	0	0	0	0	0
11.8 Special personnel services payments	0	0	0	0	0
11.9 Total personnel compensation	0	0	0	0	0
12.1 Civilian personnel benefits	0	0	0	0	0
13 Benefits for former personnel	0	0	0	0	0
21 Travel and transportation of persons	595	595	595	595	0
22 Transportation of things	0	1	1	1	0
23.1 Rental payments to GSA	0	0	0	0	0
23.2 Rental payments to others	8	121	121	121	0
23.3 Commun., util., misc. charges	0	0	0	0	0
24 Printing and reproduction	3	3	3	3	0
Other					
25.2 services	2,010	3,279	3,226	3,226	0
26 Supplies and materials	49	49	49	49	0
31 Equipment	0	5	5	5	0
32 Lands and structures	0	0	0	0	0
33 Investments and loans	0	0	0	0	0
41 Grants, subsidies and contributions	0	0	0	0	0
42 Insurance claims and indemnities	0	0	0	0	0
43 Interest and dividends	0	0	0	0	0
44 Refunds	0	0	0	0	0
99 Total Obligations	2,665	4,068	4,000	4,000	0

Department of Commerce
National Oceanic and Atmospheric Administration
Fisheries Asset Forfeiture Fund
SUMMARY OF REQUIREMENTS BY OBJECT CLASS
(Dollar amounts in thousands)

Offsetting collections	(35)	0	0	0	0
Less unobligated balance, SOY	(11,080)	(10,941)	(10,957)	(10,957)	0
Plus unobligated balance, EOY	10,941	10,957	10,957	10,957	0
Unobligated balance, rescission	0	0	0	0	0
Total Budget Authority	2,490	4,000	4,000	4,000	0

APPROPRIATION ACCOUNT: NORTH PACIFIC OBSERVER FUND

For FY 2016, NMFS estimates obligating \$3,502,000 for the North Pacific Observer Fund.

JUSTIFICATION FOR FY 2016:

On January 1, 2013, the restructured North Pacific Groundfish Observer Program (NPGOP) went into effect and made important changes to how observers are deployed, how observer coverage is funded, and the vessels and processors that must have some or all of their operations observed. Coverage levels are no longer based on vessel length and processing volume; rather, NMFS now has the flexibility to decide when and where to deploy observers based on a scientifically defensible deployment plan. The new observer program places all vessels and processors in the groundfish and halibut fisheries off Alaska into one of two observer coverage categories: (1) a full coverage category, and (2) a partial coverage category.

Vessels and processors in the full coverage category ($\geq 100\%$ observer coverage) will obtain observers by contracting directly with observer providers. Vessels and processors in the full observer coverage category are required to have at least one observer at all times. This will represent no change from the status quo for participants in the full coverage category.

Vessels and processors in the partial coverage category ($< 100\%$ observer coverage) will no longer contract independently with an observer provider, and will be required to carry an observer when they are selected through the Observer Declare and Deploy System (ODDS). Additionally, landings from all vessels in the partial coverage category will be assessed a 1.25 percent fee on standard ex-vessel prices of the landed catch weight of groundfish and halibut. The fee percentage is set in regulation and will be reviewed periodically by the Council after the second year of the program. The money generated by this fee will be used to pay for observer coverage on the vessels and processors in the partial coverage category in the following year. NMFS expects approximately \$3.4 million to be collected in fees from the FY2015 season, to be used in FY 2016 for observer coverage.

PROGRAM CHANGE FOR FY 2016:

No program change is requested for this account.

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Department of Commerce
 National Oceanic and Atmospheric Administration
North Pacific Observer Fund
SUMMARY OF RESOURCE REQUIREMENTS
 (Dollar amounts in thousands)

	Positions	FTE	Budget Authority	Direct Obligations
FY 2015 Currently Available	0	0	4,756	5,657
Adjustments to Base	0	0	(1,254)	(1,655)
less: Obligations from Prior Year Balances	0	0	0	0
FY 2016 Base	0	0	3,502	3,502
plus: 2016 Program Changes	0	0	0	0
FY 2016 Estimate	0	0	3,502	3,502

Comparison by activity/subactivity		FY 2014 Actuals		FY 2015 Currently Available		FY 2016 Base Program		FY 2016 Estimate		Increase/ (Decrease)	
		Personnel Amount	Personnel Amount	Personnel Amount	Personnel Amount	Personnel Amount	Personnel Amount	Personnel Amount	Personnel Amount		
North Pacific Observer Fund	Pos/BA	0	3,945	0	4,756	0	3,502	0	3,502	0	0
	FTE/OBL	0	3,045	0	5,657	0	3,502	0	3,502	0	0
Total: North Pacific Observer Fund	Pos/BA	0	3,945	0	4,756	0	3,502	0	3,502	0	0
	FTE/OBL	0	3,045	0	5,657	0	3,502	0	3,502	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
North Pacific Observer Fund
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

	FY 2014		FY 2015		FY 2016		FY 2016		Increase/ (Decrease)	
	Actuals		Currently Available		Base Program		Estimate			
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Direct Mandatory Obligation	0	3,045	0	5,657	0	3,502	0	3,502	0	0
Total Obligations	0	3,045	0	5,657	0	3,502	0	3,502	0	0
Adjustments to Obligations:										
Unobligated balance, adj. SOY	0	0	0	(901)	0	0	0	0	0	0
Unobligated balance, SOY	0	0	0	0	0	0	0	0	0	0
Unobligated balance, EOY	0	901	0	0	0	0	0	0	0	0
Total Budget Authority	0	3,945	0	4,756	0	3,502	0	3,502	0	0
Financing from Transfers and Other:										
Appropriation previously unavailable	0	0	0	(306)	0	(350)	0	(350)	0	0
Temporarily Reduced	0	306	0	350	0	248	0	248	0	0
Net Appropriation	0	4,251	0	4,800	0	3,400	0	3,400	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
North Pacific Observer Fund
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

Object Class	FY 2014 Actuals	FY 2015 Enacted	FY 2016 Base	FY 2016 Estimate	Increase/ (Decrease)
11 Personnel compensation					
11.1 Full-time permanent	0	0	0	0	0
11.3 Other than full-time permanent	0	0	0	0	0
11.5 Other personnel compensation	0	0	0	0	0
11.8 Special personnel services payments	0	0	0	0	0
11.9 Total personnel compensation	0	0	0	0	0
12.1 Civilian personnel benefits	0	0	0	0	0
13 Benefits for former personnel	0	0	0	0	0
21 Travel and transportation of persons	0	0	0	0	0
22 Transportation of things	0	0	0	0	0
23.1 Rental payments to GSA	0	0	0	0	0
23.2 Rental payments to others	0	0	0	0	0
23.3 Commun., util., misc. charges	0	0	0	0	0
24 Printing and reproduction	0	0	0	0	0
25.2 Other services	3,045	5,657	3,502	3,502	0
26 Supplies and materials	0	0	0	0	0
31 Equipment	0	0	0	0	0
32 Lands and structures	0	0	0	0	0
33 Investments and loans	0	0	0	0	0
41 Grants, subsidies and contributions	0	0	0	0	0
42 Insurance claims and indemnities	0	0	0	0	0
43 Interest and dividends	0	0	0	0	0
44 Refunds	0	0	0	0	0
99 Total Obligations	3,045	5,657	3,502	3,502	0

Department of Commerce
 National Oceanic and Atmospheric Administration
 North Pacific Observer Fund
SUMMARY OF RESOURCE REQUIREMENTS
 (Dollar amounts in thousands)

Less unobligated balance, SOY	0	(901)	0	0	0
Plus unobligated balance, EOY	901	0	0	0	0
Unobligated balance, rescission	0	0	0	0	0
Total Budget Authority	3,945	4,756	3,502	3,502	0

APPROPRIATION ACCOUNT: FISHERIES DISASTER ASSISTANCE FUND

For FY 2016, NMFS requests a total of \$0 for the Fisheries Disaster Assistance Fund.

JUSTIFICATION FOR FY 2016:

The Department of Commerce is authorized to provide disaster assistance under either sections 308(b) or 308(d) of the Interjurisdictional Fisheries Act or sections 312(a) or 315 of the Magnuson-Stevens Fishery Conservation and Management Act. Under both statutes, a request for a fishery disaster determination is generally made by the Governor of a State, or by a fishing community, although the Secretary of Commerce may also initiate a review. The Secretary determines whether the circumstances are consistent with relevant statutes and warrant a fishery disaster determination. If the Secretary determines that a fishery disaster has occurred, Congress may appropriate funds for disaster assistance, which are administered by the Secretary.

The Consolidated Appropriations Act, 2014 (P.L. 113-76) established a new account for fisheries disaster assistance and provided \$75.0 million within this account to mitigate the effects of commercial fishery failures and fishery resource disasters. This \$75.0 million responds to the specific disaster declarations in calendar years 2012 and 2013.

PROGRAM CHANGE FOR FY 2016:

No program change is requested for this account.

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Department of Commerce
 National Oceanic and Atmospheric Administration
 Fisheries Disaster Assistance Fund
SUMMARY OF RESOURCE REQUIREMENTS
 (Dollar amounts in thousands)

	Positions	FTE	Budget Authority	Direct Obligations
FY 2015 Currently Available	0	0	0	49,188
Adjustments to Base	0	0	0	0
less: Obligations from Prior Year Balances	0	0	0	(49,188)
FY 2016 Base	0	0	0	0
plus: 2016 Program Changes	0	0	0	0
FY 2016 Estimate	0	0	0	0

Comparison by activity/subactivity		FY 2014 Actuals		FY 2015 Currently Available		FY 2016 Base Program		FY 2016 Estimate		Increase/ (Decrease)	
		Personnel Amount	Personnel Amount	Personnel Amount	Personnel Amount	Personnel Amount	Personnel Amount	Personnel Amount	Personnel Amount		
Fisheries Disaster Assistance Fund	Pos/BA	0	74,925	0	0	0	0	0	0	0	0
	FTE/OBL	0	25,737	0	49,188	0	0	0	0	0	0
Total: Fisheries Disaster Assistance Fund	Pos/BA	0	74,925	0	0	0	0	0	0	0	0
	FTE/OBL	0	25,737	0	49,188	0	0	0	0	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Fisheries Disaster Assistance Fund
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

	FY 2014 Actuals		FY 2015 Currently Available		FY 2016 Base Program		FY 2016 Estimate		Increase/ (Decrease)	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Direct Discretionary Obligation	0	25,737	0	49,188	0	0	0	0	0	0
Total Obligations	0	25,737	0	49,188	0	0	0	0	0	0
Adjustments to Obligations:										
Unobligated balance, adj. SOY	0	0	0	(49,188)	0	0	0	0	0	0
Unobligated balance, EOY	0	49,188	0	0	0	0	0	0	0	0
Total Budget Authority	0	74,925	0	0	0	0	0	0	0	0
Financing from Transfers and Other:										
Offsetting Collections from Non-Federal Sources	0	0	0	0	0	0	0	0	0	0
Transfer to ORF	0	75	0	0	0	0	0	0	0	0
Net Appropriation	0	75,000	0	0	0	0	0	0	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Fisheries Disaster Assistance Fund
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

Object Class	FY 2014 Actuals	FY 2015 Currently Available	FY 2016 Base	FY 2016 Estimate	Increase/ (Decrease)
11 Personnel compensation					
11.1 Full-time permanent	0	0	0	0	0
11.3 Other than full-time permanent	0	0	0	0	0
11.5 Other personnel compensation	0	0	0	0	0
11.8 Special personnel services payments	0	0	0	0	0
11.9 Total personnel compensation	0	0	0	0	0
12.1 Civilian personnel benefits	0	0	0	0	0
13 Benefits for former personnel	0	0	0	0	0
21 Travel and transportation of persons	0	0	0	0	0
22 Transportation of things	0	0	0	0	0
23.1 Rental payments to GSA	0	0	0	0	0
23.2 Rental payments to others	0	0	0	0	0
23.3 Commun., util., misc. charges	0	0	0	0	0
24 Printing and reproduction	0	0	0	0	0
25.2 Other services	0	0	0	0	0
26 Supplies and materials	0	0	0	0	0
31 Equipment	0	0	0	0	0
32 Lands and structures	0	0	0	0	0
33 Investments and loans	0	0	0	0	0
41 Grants, subsidies and contributions	25,737	49,188	0	0	0
42 Insurance claims and indemnities	0	0	0	0	0
43 Interest and dividends	0	0	0	0	0
44 Refunds	0	0	0	0	0
99 Total Obligations	25,737	49,188	0	0	0

Department of Commerce
 National Oceanic and Atmospheric Administration
 Fisheries Disaster Assistance Fund
SUMMARY OF RESOURCE REQUIREMENTS
 (Dollar amounts in thousands)

Less prior year recoveries	0	0	0	0	0
Less unobligated balance, SOY	0	(49,188)	0	0	0
Plus unobligated balance, EOY	49,188	0	0	0	0
Total Budget Authority	<u>74,925</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>

BUDGET PROGRAM: OCEANIC AND ATMOSPHERIC RESEARCH

For FY 2016, NOAA requests a total of \$507,035,000 and 740 FTE for the Office of Oceanic and Atmospheric Research including an increase of \$54,126,000 and 13 FTE in net program changes.

Office of Oceanic and Atmospheric Research Overview

Office of Oceanic and Atmospheric Research (OAR) is NOAA's central research Line Office. It provides the Nation with critical environmental information through technology development and related services that support informed decision-making and promote healthy, productive, and resilient ecosystems, communities, and economies. OAR's role is three-fold: to integrate research across the agency; to improve current NOAA operational products and services; and to conduct innovative research for the development of the next generation of products and services. Scientific and technological advancements in atmosphere, ocean, coasts and climate predictions are continuously adopted from OAR to improve services across NOAA. NOAA relies on OAR to coordinate and develop research and technology for such emerging and integrative subjects as ocean acidification, aquaculture, "warn-on-forecast," climate change, diagnosis and forecast of the behavior of the Earth system, ocean exploration, unmanned aircraft systems, and autonomous underwater vehicles. OAR works with core partners to identify mission requirements which enable OAR to prioritize its research to operations (R2O) transition activities from outreach to targeted development.

OAR is organized into four Operations, Research, and Facilities (ORF) sub-programs totaling \$439,530,000 and 727 FTE.

- **Climate Research** (\$159,529,000 and 272 FTE) includes Laboratories and Cooperative Institutes and competitive research focused on establishing a greater understanding of, and ability to predict, climate variability and change, and to enhance society's ability to plan and respond.
- **Weather and Air Chemistry Research** (\$92,728 and 221 FTE) includes Laboratories and Cooperative Institutes as well as research programs focused on improving our understanding and forecasting capabilities for atmospheric events that endanger lives and property.
- **Ocean, Coastal, and Great Lakes Research** (\$175,232,000 and 224 FTE) includes Laboratories and Cooperative Institutes, research, and grant programs focused on understanding and managing habitats, processes, and resources in the oceanic, coastal, and Great Lakes environments.
- **Innovative Research and Technology** (\$12,041,000 and 10 FTE) includes High Performance Computing Initiatives, which seeks to accelerate the adoption of advanced computing, communications, and information technologies throughout NOAA.

OAR is organized into one Procurement, Acquisition, and Construction (PAC) sub-program totaling \$13,379,000 and 0 FTE.

- **System Acquisition**, which includes NOAA's investments in Research High Performance Computing. OAR supports the management of a high-performance computing system, which provides a key platform to characterize and quantify weather and climate variations and change at a range of temporal and spatial scales.

NOAA Climate Program Office

The NOAA Climate Program Office (CPO) is the central hub for climate research and data collection in NOAA. CPO manages competitive grant programs and seeks to understand climate variability and change to enhance society's ability to plan and respond. CPO implements and maintains nearly half of NOAA's Global Ocean Observing System (GOOS), sponsors research on the Earth's climate, improves climate predictive capability from weeks to decades, and develops climate products and services to enhance decision making capabilities across all sectors of society. Among other things, CPO serves as the NOAA focal point for such national and international climate efforts as maintaining the National Integrated Drought Information System, facilitating the U.S. National Climate Assessment, and leading U.S. involvement in the Sustaining Arctic Observing Networks and the Circumpolar Marine Biodiversity Monitoring Plan.

Office of Weather & Air Quality

The Office of Weather and Air Quality (OWAQ) finds, funds, and fosters research to improve observations, analyses, and modeling capabilities that lead to improved operations in the form of more accurate and timely warnings and forecasts of high-impact weather that causes loss of life and property, and air quality forecasts that impact human health and cause crop damage. OWAQ manages the U.S. Weather Research Program and NOAA's involvement in the multi-agency Earth System Predictive Capability (ESPC).

National Sea Grant College Program

Congress established the National Sea Grant College Program in 1966 to enhance the development, use, and conservation of the Nation's coastal, marine, and Great Lakes resources through a network of Sea Grant Colleges. Currently, there are 33 university-based Sea Grant programs located in every U.S. coastal and Great Lakes state, Vermont, and Puerto Rico. These programs have aligned their efforts around the NOAA National Sea Grant College Program Strategic Action Agenda, which focuses on four critical areas: Safe and Sustainable Seafood Supply, Sustainable Coastal Development, Healthy Coastal Ecosystems and Hazard Resilience in Coastal Communities.

Office of Ocean Exploration and Research

The Office of Ocean Exploration and Research (OER) supports: (1) scientific baseline characterization of unknown or poorly-known ocean areas, processes, and resources; (2) transitioning observations and discoveries to catalyze new areas of scientific inquiry and to support natural resource management decisions; (3) increasing the pace, scope, and efficiency of exploration and research through the development of new and innovative technologies; and (4) engaging a wide variety of audiences by innovative means, including new telepresence technologies. OER operates the *Okeanos Explorer*, a NOAA ship dedicated to the ocean exploration missions.

Other Ecosystem Programs

Other Ecosystem Programs is comprised of the Ocean Acidification Program (OAP). The OAP maintains long-term OA monitoring; conducts research designed to enhance conserving marine ecosystems sensitive to OA; promotes OA educational opportunities; engages national public outreach activities related to OA and its impacts; and coordinates OA activities across other agencies and appropriate international ocean science bodies.

NOAA High Performance Computing and Communications Program

The High Performance Computing and Communications Program (HPCC) supports many NOAA Strategic Plan objectives utilizing information technology research targeted at improving NOAA's mission, services, and science education. HPCC seeks to make major improvements in

the ability to forecast weather and climate, and to disseminate environmental information by stimulating modernization of NOAA's computationally-intensive services.

Research and Development (R&D) Investments:

The NOAA FY 2016 Budget estimates for R&D investments are the result of an integrated requirements-based strategic planning process. This process provides the structure to link NOAA's strategic vision with programmatic detail and budget development, with the goal of maximizing resources while optimizing capabilities. OAR requests \$394,690,000 for investments in R&D in the FY 2016 budget.

The NOAA Research Council - an internal body composed of senior scientific personnel from every Line Office in the agency - developed NOAA's most recent Five-Year Research and Development Plan (FY 2013-2017). This plan guides NOAA's R&D activities and provides a common understanding among NOAA's leadership, its workforce, its partners, constituents and Congress on the value of NOAA's R&D activities.

Significant Inflationary Adjustments:

NOAA's FY 2016 Base includes an increase of \$4,146,000 to account for the full funding requirement for inflationary adjustments to current programs for OAR activities. This includes the estimated 2016 Federal pay raise of 1.3 percent as well as inflationary increases for non-labor activities, including service contracts, utilities, field office lease payments, and rent charges from the General Services Administration (GSA).

NOAA also requests the following transfers for a net change of \$2,484,000 and 16 FTE to OAR:

From Office	PPA	To Office	PPA	Amount/FTE
OAR	Weather and Air Chemistry Programs- U.S. Weather Research Program (USWRP)	OAR	Weather and Air Chemistry – Laboratories & Cooperative Institutes	\$200,000/0FTE
PS	NOAA Wide Corporate Services and Agency Management Base	OAR	Weather and Air Chemistry – Laboratories & Cooperative Institutes	\$684,000/9FTE
NESDIS	National Center for Environmental Intelligence (NCEI)	OAR	Ocean, Coastal, & Great Lakes Laboratories & Cooperative Institutes	\$1,800,000/7FTE

NOAA requests a transfer of \$200,000 and 0 FTE from Weather and Air Chemistry Programs - USWRP to Weather and Air Chemistry – Laboratories & Cooperative Institutes to maintain a permanent capability in air chemistry modeling within OAR's weather laboratories. The importance of this capability in improving weather and air quality predictions was demonstrated within the USWRP and needs to be permanently supported within OAR's Air Resources Laboratory. In addition, NOAA requests a transfer of \$684,000 and 9 FTE to move the funding and functions of the Information Resource Branch (IRB) (Boulder Labs Library) from the NOAA Chief Information Office to OAR. This transfer will streamline management of the IRB by co-locating management with the facility and the customers it serves. Finally, NOAA requests a transfer of \$1,800,000 and 7 FTE to move the NOAA Central Library, as well as two regional libraries (Miami and Seattle), from NESDIS to OAR. This transfer will shift the management of the Central Library to the largest user in NOAA. It will allow the

Central Library to continue to provide useful corporate services, and the regional libraries to streamline the library management by co-locating management with the facility and customers it serves.

Headquarters Administrative Costs:

In FY 2016, OAR Line Office headquarters will use \$16,534,000 in funds and 59 FTE to support general management activities, financial, and budgeting, and IT related expenses, as well as supporting facilities and other general operating costs. These funds also include support for service contracts, utilities, and rent charges from the General Services Administration. Specifically, OAR will use headquarters administrative funds to support the following:

Headquarters Program Support Type	Description	FY 2016 Amount	FY 2016 FTE associated with OAR HQ
General Management & Direction/Executive Management	Includes Assistant Administrator's office, public affairs, information services	\$6,842,000	26.5
Budget & Finance	Includes Budget, Finance and Accounting	\$2,724,000	18.5
Information Technology	Includes IT-related expenses and other CIO related activities	\$1,788,000	5.5
Facilities/Other Administrative (CAO Functions)	Includes Facilities and Security costs, as well as other CAO related activities	\$2,771,000	10
Human Resources	All HR services, including EEO	\$1,169,000	8.5
Acquisitions and Grants	Includes Acquisitions and Grants functions	\$1,240,000	0
Total		\$16,534,000	59

APPROPRIATION ACCOUNT: OPERATIONS, RESEARCH, AND FACILITIES

SUB-PROGRAM: CLIMATE RESEARCH

The mission of the Climate Research sub-program is to monitor and understand Earth's climate system to predict both the potential long-term changes in global climate as well as shorter-term climate variations that are of societal and economic importance.

The objectives of the Climate Research sub-program are to

- describe and understand the state of the climate through sustained atmospheric and oceanic observations and research related to global distributions, trends, sources, and sinks of atmospheric constituents that are capable of forcing change in the climate of the Earth;
- understand, predict, and project climate variability and change from weeks to decades to centennial timescales;
- conduct advanced modeling of the climate and Earth systems, including natural climate variability such as El Niño, anthropogenic forced climate change, stratospheric ozone depletion, and interactions between climate, biogeochemical cycles, and ecosystems;
- sustain the observing systems essential for climate, oceanographic, monitoring, and data management;
- conduct physical process research to advance a seamless suite of information and forecast products, ranging from short-term weather forecasts to longer-term climate forecasts and assessments; and
- understand how decision makers use climate information to improve the ability of society to plan for and respond to climate variability and change.

LABORATORIES AND COOPERATIVE INSTITUTES

A central objective of Climate Research is to predict, to the extent possible, the future evolution of the Earth system in order to provide a basis for informed decision making. Such predictions require a comprehensive understanding of the physical, chemical, and dynamical processes that shape the climate. OAR's Laboratories and Cooperative Institutes are central to the climate research community's effort to improve that understanding and test it through the development of state-of-the-art Earth System Models, and then to use those models to predict the future state of the climate. Observations of the Earth system and their analysis underpin the efforts that form the scientific basis for Climate Research. This section describes the activities of OAR's Laboratories and Cooperative Institutes in advancing all four Next Generation Strategic Plan Objectives of NOAA's Climate Adaptation and Mitigation goal.

Earth System Research Laboratory (ESRL)

ESRL was formed to pursue a broad and comprehensive understanding of the Earth system. At ESRL, three divisions are working toward a greater understanding of the changing climate system and its impacts through a number of areas aimed at understanding Earth system processes and changes, as follows:

Physical Sciences Division (PSD)/ESRL

PSD's core mission is to conduct physical science research to advance NOAA's capacity to observe, understand, critically evaluate, and advance prediction of the physical behavior of the earth system (atmosphere, ocean, cryosphere, hydrosphere, land) and related impacts on global-to-local scales over periods of time from days to decades.

Chemical Sciences Division (CSD)/ESRL

CSD, in partnership with the Cooperative Institute for Research in Environmental Sciences (CIRES), conducts studies that are fundamental to understanding and prediction of Earth's climate, U.S. air quality, and the stratospheric ozone layer. Research is focused on understanding and quantifying man-made and natural emissions of gases and particles to the atmosphere, chemical and physical processes that alter the composition of the atmosphere, and transport and mixing that redistribute pollutants throughout the atmosphere.

Global Monitoring Division (GMD)/ESRL

GMD, in partnership with CIRES, conducts sustained observations and research toward understanding the global distributions, trends, sources, and sinks of atmospheric constituents that are capable of forcing change in Earth's climate and environment. This research advances climate projections and provides scientific policy-relevant, decision support information to enhance society's ability to plan and respond by providing the best possible information on atmospheric constituents that drive climate change, stratospheric ozone depletion, and baseline air quality.

Geophysical Fluid Dynamics Laboratory (GFDL)

GFDL is engaged in comprehensive, long lead-time research on climate and Earth system sciences to better understand natural climate variability and anthropogenic climate change. GFDL develops and uses mathematical models and high-performance computer simulations to advance understanding of the behavior of the atmosphere, ocean, biosphere, and cryosphere, and produce a range of projections about the future global climate, terrestrial and marine ecosystems, atmospheric composition, and air quality.

Atlantic Oceanographic and Meteorological Laboratory (AOML)

AOML conducts research based on models and observations to understand and characterize the role of the oceans in climate variability and change. Techniques vary from shipboard-conducted process studies, models, long-term continuous time series, and satellite-derived products. AOML's research related to ocean dynamics includes the Meridional Overturning Circulation, western boundary currents, and Gulf of Mexico and Caribbean Sea oceanography. In addition to global *in situ* and hydrographic observations, satellite observations and numerical modeling also complement and augment AOML's research.

Pacific Marine Environmental Laboratory (PMEL)

PMEL improves scientific understanding of the changing climate system and its impacts by providing the core capabilities of research, technology development, and observing system implementation that are central to meeting NOAA's climate goals. PMEL also engages in two climate and ecosystem research activities that are more broadly focused: PMEL's Ocean Acidification (OA) and Ecosystems-Fisheries Oceanography Coordinated Investigations (EcoFOCI) research programs.

Air Resources Laboratory (ARL)

ARL concentrates on: (1) understanding how the interactions of the atmosphere and the underlying land surface influence, and are influenced by, the climate and, (2) analyzing long-term observational datasets to understand climate variability and change, especially above the surface of the earth. ARL conducts studies that measure key physical and chemical processes that influence climate—such as the interaction of water in the atmosphere, soil, and plants.

Schedule, Milestones and Deliverables:

FY 2016 – 2020

Physical Sciences Division / Earth System Research Laboratory (PSD/ESRL)

- Develop improved wave and flux parameterizations for polar sea and ice regimes to advance coupled climate modeling in the Arctic
- Develop a high-resolution global multimodel diagnostic capability to resolve high-impact heat wave, droughts, floods, and extreme precipitation to assess changes in the frequency and intensity of extreme events
- Complete analysis of CalWater2 field experiments to advance understanding the projected changes in the roles of atmospheric rivers and aerosols in water supply and extreme precipitation on climate timescales

Chemical Sciences Division / Earth System Research Laboratory (CSD/ESRL)

- Conduct intensive field studies in the troposphere approximately every other year
- Short-lived climate pollutant (SLCP: e.g., black carbon; hydrofluorocarbons - HFCs) studies integrate laboratory data, field measurements, and modeling results to evaluate potential win-win solutions for climate, air quality, and stratospheric ozone depletion environmental issues

Global Monitoring Division / Earth System Research Laboratory (GMD/ESRL)

- Continue providing long term global records of greenhouse gases, stratospheric ozone, and aerosols to improve predictions and society's ability to plan and respond to change
- Publish updates on Annual Greenhouse Gas Index, Ozone Depleting Gas Index
- Update and refine Carbon Tracker
- Provide timely South Pole Ozone hole updates

Geophysical Fluid Dynamics Laboratory (GFDL)

- Communicate earth system modeling (ESM) research findings through assessments, publications, and climate services
- Conduct decadal predictability studies and develop prototype decadal predictions of climate and of impacts on marine ecosystems
- Develop high-resolution prototype seasonal-to-interannual prediction system of future marine ecosystem variability (FY2018)
- Apply new ESMs for tipping point prediction in global estuarine, coastal, and benthic ecosystems (FY 2019)
- Assess the impact of the physical and chemical influences of soot and dust aerosol on Arctic climate (FY 2020)

Atlantic Oceanographic and Meteorological Laboratory (AOML)

- Complete eight new reports using observations from ocean temperature and salinity profiles that describe the state of the ocean's meridional heat transport
- Collect Upper layer temperature data and meteorological weather data
- Provide the workforce to deploy and maintain an array of 1,200 surface drifters, some equipped with pressure and wind sensors

Pacific Marine Environmental Laboratory (PMEL)

- Conduct a major survey cruise to monitor marine aerosols and air quality approximately every other year
- Complete two sections per year across the Solomon Sea, and conduct numerical modeling studies to help interpret the observations

- Maintain 38 existing CO₂ and OA moorings and deploy an average of 1 additional mooring each year
- Complete RAMA (FY 2020)

AOML and PMEL

- Deploy approximately 50 Argo floats and 10 Deep Argo floats per year to replace older floats that have reached the end of their useful lives
- Complete 1-2 hydrography cruises annually
- Complete four reports or publications describing carbon dioxide exchange at the ocean surface globally

Air Resources Laboratory (ARL)

- Analyze climate observations above the earth’s surface (e.g., temperature, clouds) to improve the understanding of climate variability and change
- Contribute to national/international climate assessments (e.g., Intergovernmental Panel on Climate Change) to inform climate mitigation and adaptation
- Perform studies of spatial variability around surface climate stations
- Conduct evaluation studies of physical energy fluxes in different regions of the continental United States to improve seasonal predictions of water resources

Performance Goals and Measurement Data:

Performance Measure: Increase number of new regional scale projections for assessments and decision support (per year)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	3	3	6	7	8	9	10
Description: The number of meaningful regional projections will increase as NOAA’s Earth System Model increases in realism and complexity. Examples of regional scale projections include: regional sea level rise projections that require explicit representation of the global eddy field in the ocean models; projections of parameters essential to ocean and coastal ecosystem forecasting; assessment of regional carbon budgets; and projections of climate change in the Arctic region that require improved sea ice models.							

Performance Measure: Improve climate model performance and utility based on model advancements (planned milestones) and climate assessments benefited	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	21	18	15	20	20	20	20
Description: This measure will reflect the major advancements made in the long-term development of models and will reflect the value of models as the outputs are used in major assessments such as the Intergovernmental Panel on Climate Change (IPCC) and the United States Global Change Research Program (USGCRP) National Assessment. Models are used to further research and discovery, are considered valuable for analysis in assessments, and improve the value of assessments for policy makers. A major outcome of this work will be improved regional forecast/ prediction/ projection products based on improved models and methodologies. This measure is based on the number of model advancements, model evaluations, and assessments and publications that use the model outputs.							

Performance Measure: Reduce percentage uncertainty in possible 21st century sea level rise (0-1m = 100% uncertainty)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	75%	75%	70%	65%	60%	55%	50%
Description: This metric is calculated using the IPCC 4th Assessment Report estimates for the range of 21st century global-mean sea level rise. Completion of the proposed effort will reduce the uncertainties by almost half as a result of modeling that better captures the more accurate measurements of ice-sheet discharge, thermal expansion, and regional anomalies due to ocean circulation and heat storage. Reducing the uncertainty in sea level rise will allow government and industry to have better information on projected sea level rise and therefore tailor their planning and actions to address the impacts.							

Performance Measure: Increase cumulative number of new decadal prototype forecasts and predictions made with high-resolution coupled climate models	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	3	3	5	6	7	8	9
Description: One of the goals of this activity is to develop new prototype forecasts and predictions on decade time-scales for climate changes and impacts such as sea level rise, Arctic climate impacts, and rapid climate change. These forecasts and predictions are dependent on the development of state-of-the-art climate models.							

Performance Measure: Expand cumulative number of analyses of climate above the surface of the earth and related observing systems	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	3	4	5	6	7	8	9
Description: Changes in atmospheric conditions can be important indicators of climate change, and patterns of change can help in attributing climate change to specific causes. Analyses of such changes, with emphasis on atmospheric temperature, stability, and circulation and on clouds and planetary albedo, and on the evaluation of systems for observing those variables, will increase understanding of these issues.							

Performance Measure: Increase cumulative number of regions for which a surface flux study has been conducted	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	2	3	4	5	6	7	8
Description: "Surface flux" refers to the exchange of energy (e.g., heat) and substances (e.g., water) between the land surface and the atmosphere. These fluxes are critical drivers of climate change because they affect air and land temperatures and other important aspects of the climate. These fluxes also drive important climate-related phenomena such as droughts and such weather-related phenomena as the development of storms. Surface fluxes vary significantly with surface and weather conditions.							

Performance Measure: Increase annual number of journal articles published in peer-reviewed literature	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	50	50	50	50	50	50	50

Description: PMEL conducts basic research and reports the results in peer-reviewed journal articles. The annual publication total is a measure of the laboratory climate research output. Past research papers have addressed such topics as describing the predictability of El Niño and La Niña events and describing the negative impacts on marine ecosystems of ocean acidification. These publications document advances in scientific understanding that lead to improved capabilities (analyses, forecasts, etc.) or identify “next steps” for research.

Performance Measure: Expand cumulative number of Deep Argo profiling floats deployed	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	4	8	12	20	28	36	48

Description: Complementary measurements of sea surface height (from satellite altimetry and tide gauges), ocean mass (from gravity satellites), and ocean density changes (from Argo temperature and salinity) together now make it possible to observe sea level variability and to understand its subsurface causes. Extension of Argo to the ocean bottom is a compelling objective needed to close the global sea level and energy budgets, and to resolve the pattern and rates of deep ocean multi-decadal warming signals that have been identified in a number of the ocean’s deep basins.

Performance Measure: Increase cumulative number of CSD reports to stakeholders and decision makers that provide a policy-relevant scientific synthesis of results from intensive field studies, process studies, and analyses.	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	5	6	6	7	7	8	8

Description: Reports provide a distillation of key scientific findings on emissions, transport, atmospheric processing, and impacts of climate forcing agents, their precursors and species related to air quality degradation to inform policy development and emission management strategies for climate and air quality. Recent stakeholders include the Texas Commission on Environmental Quality (TCEQ) and the California Air Resources Board (CARB).

Performance Measure: Increase cumulative number of substances, proposed as replacements for stratospheric ozone depleting industrial compounds (e.g., solvents; refrigerants) whose ozone depleting potential and greenhouse-warming potential have been evaluated	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	2	3	4	5	5	6	6

Description: CSD provides to industry stakeholders critical information on climate impacts of proposed replacement stratospheric ozone depleting chemicals prior to manufacture.

Performance Measure: Grow cumulative number of individual emission sources and source regions relevant to climate and air quality whose inventories have been evaluated for accuracy via top-down analyses	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	2	2	3	3	4	4	5
Description: CSD provides verification of critical inputs to climate models resulting in reduced uncertainty in model outputs, which provides decision makers greater confidence in establishing policies and emission management strategies.							

Performance Measure: Uncertainty of the North American carbon sink to better understand the contribution of human activities toward increasing atmospheric carbon dioxide and methane (million tons carbon/year) (Measure 3.1f)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	405	410	405	400	400	390	385
Description: Please see measure description under the Annual Performance Plan (APP) under section Targets and Performance Summary.							

REGIONAL CLIMATE DATA AND INFORMATION

NOAA's Regional Climate Data and Information Program, overseen by the Climate Program Office, supports *in situ* and remotely-sensed global climate data and information to: promote environmental stewardship and resilience to extreme events; describe, monitor and assess the climate; and support efforts to predict changes in the Earth's environment. Through information collected by climate observing networks, NOAA can assemble, develop, and communicate data and information about the trends and predictions of climate and weather events to decision makers. NOAA supports the following under the Regional Climate Data and Information Program:

- The **U.S. Climate Reference Network (USCRN)** provides baseline, high-quality surface observations of air temperature and precipitation to detect long-term changes in climate through a robust climate record.
- The **National Integrated Drought Information System (NIDIS)** provides dynamic and easily accessible drought information for the Nation. Among the decision makers who are benefitting from this source of authoritative, reliable information are farmers making decisions about crops, forestry professionals planning ahead for the next fire season, and urban water managers preparing for high-demand seasons.
- NOAA's **Observing System Monitoring Program** provides early detection and remediation of network problems that can adversely affect the quality of data records and diminish the ability to evaluate climate variability and change.
- NOAA's **Assessment Services Program** delivers climate information to support decision-making by providing authoritative, relevant, accessible and useful assessments in a timely, sustained, and repeatable manner for a wide range of audiences and key stakeholders. The program supports three types of climate assessment: national and international science assessments, problem-focused assessments, and needs assessments.
- The **Climate Model Data Archive** will house model-based data records and implement an operational archive and access capability for the next generation high resolution climate reanalysis and reforecasts datasets. The Archive also addresses the recommendation of the NOAA Science Advisory Board that NOAA develop products from climate model outputs. The Climate Model Data Archive provides a single point of access to several new NOAA datasets and will improve linkages between research findings and the transfer of those findings into operational capabilities.
- The **NOAA Climate.gov** Portal provides easy public access to NOAA's and its partners' climate science, data, and information services. NOAA Climate.gov is a crucial element in the agency's Climate Mission Goal: "a climate-literate public that understands its vulnerabilities to a changing climate and makes informed decisions." Climate.gov also hosts and supports the U.S. Climate Resilience Toolkit (toolkit.climate.gov), called for in the President's Climate Action Plan.
- The **Communications and Education Program** manages and maintains NOAA Climate.gov, and is actively working to build NOAA's and partners' capacity for climate communication, education, and engagement, while also working to integrate NOAA's and its partners' climate data and information into a coordinated portfolio of projects, products, and partnerships to promote public climate literacy and build resilience to climate-related extreme events.
- The **Arctic Research Program** focuses on sustained observations and retrospective analysis of key variables in the Arctic region's atmosphere, ocean, and sea ice cover to document variability, detect change, and evaluate impacts of climate change on marine ecosystems. The Arctic Research Program (ARP) and its national and international partners

have been leaders in documenting the changing state of the Arctic region and reporting the changes to the public and policy officials.

- The mission of the **National Climate Predictions and Projections (NCP) Platform** is to accelerate the application of knowledge about climate variability and change at regional and local spatial scales to adaptation and preparedness planning efforts. The Global Interoperability Program (GIP) advances software modeling infrastructure in support of climate model development and the use of model data.
- NOAA provides funding for both internal and external research and development programs through CPO's **Climate and Societal Interactions (CSI)** activity. CSI provides national leadership in developing interdisciplinary science and services, including assessments, for application in climate-sensitive sectors and regions.
 - As part of CSI, the **Regional Integrated Sciences and Assessments (RISA)** program supports research teams that help build the Nation's capacity to prepare for and adapt to climate variability and change.

Schedule and Milestones:

NIDIS

- Increase number of interoperable drought systems accessible through the U.S. Drought Portal to 40 (FY 2016 – 2018)
- Monitor gaps analysis and spatial analysis of water demand for the pilot basins.
- Improve drought indicators and indices in support of the Regional Drought Early Warning Information System (RDEWS)
- Assimilate drought impacts data and information into a database for use with different types of drought conditions across climate timescales.

Assessment Services

- Deploy full climate indicator system through the Global Change Information System, in partnership with other Federal agencies. (FY 2016)
- Produce reviewable draft of the National Climate Assessment and update assessment content models for use by the assessment process. (FY 2017)
- Complete and publish of the National Climate Assessment synthesis. (FY 2018)

RISA

- Conduct climate training for U.S. Forest Service employees. (FY 2016)
- Perform hazard outlook for disaster management in the Western U.S. (FY 2016)
- Complete water reservoir data visualization tool for the Southern U.S. (FY 2016)
- Conduct climate training for tribal communities in the Southern U.S. (FY 2016 – 2017)
- Create new experimental drought indicators based on decision making needs in the NIDIS Pilot regions. (FY 2018 – FY 2020)

NOAA Climate.gov Portal

- Build and launch a mobile-friendly version of Climate.gov (FY 2016)
- Expand and evolve Climate.gov's "Data Snapshots" and "Dataset Gallery" sections, based on user demand and feedback (FY 2016)
- Develop and deploy newly redesigned "Climate Explorer" and "Climate Widget" applications in the Climate Resilience Toolkit (CRT) for browsing climate data in geospatial and historical contexts; make both tools compatible with mobile devices (FY 2016)
- Expand the CRT's catalog of training courses to cover all of the section's topics, and stitched together into purposeful learning progressions for building skill and capacity among non-scientists (FY 2016 - 2020)
- Add an online discussion forum and National "help desk" to facilitate knowledge sharing between climate experts and stakeholders in businesses and communities, and to facilitate peer-to-peer knowledge sharing (FY 2016 - 2020)

- Allow the CRT's Climate Explorer users to define their own extreme event thresholds (FY 2017)
- Expand the CRT's offering of map layers showing climate-related stressors, people and assets impacted, and climate projections (FY2016 - 2020)
- Make user-driven refinements in the Climate.gov and Portals' interface designs and functionality (FY 2018 and FY 2020)
- Develop and publish case studies in the CRT highlighting businesses, communities, and resource managers taking action to build resilience to climate-related impacts (FY 2016 – 2020)

Communication and Education

- Launch a series of public engagements to help citizens and stakeholders understand their vulnerability to extremes of weather, climate and the environment and the tools available to help them adapt and build resilience (FY 2016 – 2020)
- Launch a new public engagement effort to teach citizens, educators, and decision makers how to use Climate.gov's geospatial tools in their work. (FY 2016 – 2020)
- Publish narratives and data visualizations that show how NOAA advances scientific understanding of Earth's climate variability and change, and how those advances can and do benefit society. (FY 2016 – 2020)

Arctic Research Program

- Service the Arctic upward looking ice sonar on the Chukchi Plateau. (FY 2016 – 2020)
- Deploy ice mass balance buoys in the Pacific Arctic. (FY 2016 – 2020)
- Carry out repeat of the Chukchi Sea during the second decade of the RUSALCA program (FY2016 - 2020)
- Build a Pacific Arctic Climate Observing System together with the international partners within the Pacific Arctic Group (PAG)
- Build a modeling program to use these Pacific Arctic Observations to further constrain and improve capabilities of mid-latitude impacts predictions. (FY 2016 – 2020)
- Support the design, publication and distribution of the annual Arctic Report Card

Performance Goals and Measurement Data:

NIDIS Early Warning Systems (to support Regional Services delivery)

Performance Measure:	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
Increase number of states and territories working with NIDIS to incorporate drought early warning information into their drought adaptation and mitigation plans (Cumulative)	9	10	15	22	22	26	26
Description: This performance measure is based on the number of states and territories that partner with NIDIS to incorporate drought early warning information into their drought planning activities. Activities that count toward this measure include: local or regional drought planning/management groups; use of tailored information from the U.S. Drought Portal to establish drought indicators and set management triggers in state and territory drought adaptation and mitigation plans; and incorporation of information from basin specific drought monitors developed through the drought early warning information systems into either state and territory drought adaptation and mitigation plans or as part of state and territory drought planning and management groups.							

Assessment Services

Performance Measure: Increase annual number of climate change related impacts, vulnerability, adaptation, or mitigation information topics addressed in the Assessments	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	8	8	8	8	8	8	8
Description: This performance measure will demonstrate the role of formal climate change assessments in decisions to address climate change impacts by identifying the number of topics addressed in the assessments that are considered by business, government, or the public that affected decisions related to improved climate resilience. Information topics are based on the U.S. Global Change Research Program report, "Global Climate Change Impacts in the U.S." This measure will track the extent to which the USGCRP topical information items are used by industry, etc., to inform their key decisions on how to mitigate or adapt to climate change.							

NOAA Climate.gov Portal

Performance Measure: Increase percentage growth in number of visits to NOAA's Climate Portal over the preceding year's measure	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	N/A	FY14 +10%	FY15 +10%	FY16 +10%	FY17 +10%	FY18 +10%	FY19 +10%
Description: This performance measure will show the ongoing increase in the average number of visits to NOAA Climate.gov among the Portal's four target audiences. The average number of monthly visits in FY 2012 was 56,932. The average number of monthly visits in FY 2013 was 145,390, a 153% growth above the FY 2012 baseline. The average number of monthly visits in FY 2014 was 249,918, a 72% increase over FY 2013.							

Performance Measure: Increase percentage growth in number of return visits to each section in NOAA Climate.gov over the preceding year's measure.	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	N/A	N/A	10%	10%	10%	10%	10%
Description: This performance measure aims to show an ongoing increase in the average number of return visits to each of the Portal's sections. The deployment of Google Analytics gives NOAA the ability to track return visitors, helping build relationships with target audiences.							

Communication and Education

Performance Measure: Percentage Improvement in the index measurement of the Quality of Relationship between engagement personnel and the public they serve (Measure 3.1j).	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	75.2	N/A	77	N/A	79	N/A	81
Description: Please see measure description under the Annual Performance Plan (APP) under section Targets and Performance Summary.							

Regional Information Applications

Performance Measure: Number of regionally and sectorally focused climate impacts and adaptation studies communicated to decision makers (per year)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	27	27	27	27	27	27	27
Description: Number of peer-reviewed publications and reports published and released in one fiscal year. The publications/reports are developed through interaction with and/or communication to stakeholders. Publications and reports are collected from investigators conducting climate impacts and adaptation research in cooperation with stakeholders. The goal of this research is to better understand and enhance the use of NOAA products and information to meet user requirements for natural resource management information in various sectors (e.g. drought and water resources, fire risk, ecosystem and coastal impacts, sea-level rise, human health, agriculture, etc.)							

Climate & Societal Interactions

Performance Measure: Number of states or territories using new or tailored climate services (tools, information, technical assistance, or products) as a result of regional, state and local interaction with decision makers (Each Year)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	5	6	7	8	9	10	11
Description: The number of products and services, provided or existing products and services that are modified/expanded for new user groups or regions. "Products and services" includes technical assistance, training, and guidance documents to enable planning and decision making.							

Performance Measure: Annual percentage of U.S. states and territories that use NOAA climate information and services to improve decision making in the face of a changing climate (Measure 3.1h)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	24%	25%	27%	29%	29%	30%	30%
Description: Please see measure description under the Annual Performance Plan (APP) under section Targets and Performance Summary.							

Arctic Research Program

Performance Measure:	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
Increase the number of Arctic system products needed to clarify the causes and consequences of Pacific Water influx into the Arctic Ocean.	N/A	1	3	3	5	7	7

Description: This performance measure describes the increase in the number of value-added products (based on observations) describing the changes in time of Pacific and Atlantic water fluxes in the Pacific sector of the Arctic Ocean region. Monitoring these fluxes is important to understand the variability of sea-ice extent and volume and the consequent physical and ecosystem changes occurring in the Arctic. These include data sets useful for mid-latitude modelers, data that can be assimilated into sea ice ecosystem models and information that will allow the community to create benchmark maps of marine life, currents, and fluxes in the changing Pacific Arctic Ocean. Data will be stored on the AOOS website and linked with the Arctic Council's pan-Arctic monitoring programs.

CLIMATE COMPETITIVE RESEARCH

Climate Competitive Research funds high-priority mission-critical climate science through a competitive selection process within NOAA and its academic partners to advance the understanding of Earth's climate system (including its atmospheric, oceanic, land, and snow and ice components) as well as the impacts of climate on society. The program also provides strategic guidance and oversight for the agency's climate science and services programs. Competitive grant efforts within Climate Competitive Research are now organized within five activities:

Earth System Science (ESS)

The Earth System Science (ESS) activity provides the process-level understanding of the climate system through observation, modeling, research analysis, and field studies to support the development of improved climate models and predictions in support of NOAA's mission. ESS-sponsored research is carried out at NOAA and other Federal laboratories, NOAA Cooperative Institutes, academic institutions, and private research companies, and is coordinated with major national and international scientific bodies including the World Climate Research Programme, the International Geosphere-Biosphere Programme, and the U.S. Global Change Research Program.

Modeling, Analysis, Predictions, and Projections (MAPP)

The mission of the MAPP activity is to enhance the Nation's capability to predict variability and changes in Earth's climate system, to improve the representation of Earth system processes in models, and to test the limits of model capabilities towards the goal of producing model output on scales relevant to decision makers. MAPP focuses on the coupling, integration, and application of Earth System Models and analyses across NOAA, among partner agencies, and with the external research community. MAPP focuses on targeted infrastructure support, operates a competitive grants program, encourages community interaction through task forces and webinars, and supports mechanisms that enable the transference of research findings into NOAA's operations.

Climate Monitoring, Analyses, and Diagnostics (CMAD)

CMAD contributes to the development of continuous records, analyses, and diagnostics of a range of ocean, atmosphere, and land surface parameters based on observational information. CMAD ensures that high-quality data sets needed to understand the climate system are available to the research community for further analysis and supports projects that document and study observed variations in climate. Analysis products support other program efforts in modeling of the climate system and developing targeted services to better inform society about potential climate impacts and possible response options.

Climate and Societal Interactions (CSI)

CSI's mission is to improve resilience and preparedness in diverse socio-economic regions and sectors throughout the U.S. and abroad through the use of climate knowledge and information. Our research advances the Nation's understanding of climate-related risks and vulnerabilities across multiple stressors and risk management choices. By supporting diverse partnership networks between scientists and decision makers, CSI enhances capacity among decision makers to effectively co-produce and utilize climate information in risk management, adaptation and development. Through supporting the creation of knowledge and capacity for adaptation, these efforts support NOAA's vision to create and sustain enhanced resilience in ecosystems, communities, and economies. CSI programs that sit under Climate Competitive Research include: International Research and Applications Project (IRAP), Sectoral Applications Research Program (SARP), Coastal and Ocean Climate Applications (COCA). For information on the

Regional Integrated Sciences and Assessments (RISA) or the National Integrated Drought Information System (NIDIS), see Regional Climate Data and information.

Climate and U.S. Fish Stocks

Healthy and productive fisheries are an essential component of U.S. economies and societies. Americans consume about five billion pounds of seafood each year.¹ In 2011, U.S. marine commercial and recreational fisheries contributed approximately \$200 billion in sales impacts and 1.7 million jobs to the national economy.² Sustainable fisheries create and sustain jobs, stabilize economies in coastal working waterfronts, provide opportunities for commerce, and help to meet the growing demand for seafood across the U.S. and the world. This program advances understanding and management of the impacts of climate variability and change on U.S. fish stocks, their prey, and habitat, with a focus on the Northeast groundfish region.

Performance Goals and Measurement Data:

Performance Measure: Increase cumulative number of science-based adaptation tools and technologies that are used by NOAA partners and stakeholders to improve ecosystem-based management of fisheries.	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	N/A	0	1	2	3	5	5
Description: This measure tracks success in translating research findings into adaptation tools and technologies used by the fisheries management community. The use of these products will improve sustainable management to enhance ecological and economic resilience in the face of change.							

Performance Measure: Expand cumulative site-years of data collection for cryospheric, boundary layer mean and turbulent properties, hydrometeorological, and oceanic process studies	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	30	105	115	125	135	145	155
Description: Process studies in the polar regions, over the ocean, in coastal watersheds, and mountainous terrain depend on precise, robust, routine, and relevant observations of the Earth system at time and space scales to diagnose its behavior and to assess the skill of predictive tools used to forecast its future.							

¹ National Marine Fisheries Service. 2012. Fisheries of the United States, 2011. U.S. Department of Commerce, Current Fisheries Statistics No. 2011.

² National Marine Fisheries Service. 2012. Fisheries Economics of the United States, 2011. U.S. Department of Commerce, NOAA Technical Memorandum. NOAA Fisheries-F/SPO-128, 136p.

PROGRAM CHANGES FOR 2016:

Climate Laboratories and Cooperative Institutes: Atmospheric Baseline Observatories (Base Funding: \$7,200,000 and 12 FTE; Program Change: +\$3,000,000 and 0 FTE): NOAA requests an increase of \$3,000,000 and 0 FTE for a total of \$10,200,000 and 12 FTE to maintain 50+ years of sustained observations and research at NOAA's six Atmospheric Baseline Observatories (ABO) which document trends and distributions of atmospheric constituents influencing global climate, ozone depletion, and changes in baseline air quality.

Proposed Actions:

The proposed investment will allow NOAA to continue full operations at all six ABOs. The ABOs are at operational risk due to long-term erosion of funding from rising operational costs owing to the remote locations of these sites, deterioration and extreme weathering of structures over decades of use, increasing instrumentation requirements, and rising needs to upgrade data collection, distribution, and analysis capabilities. Associated with these rising costs is the decline in funding support from partnering agencies. The National Science Foundation (NSF) has historically provided significant logistical support at the South Pole and Greenland ABOs, but is no longer able to do so in full. NSF support has included the provision of free buildings, maintenance, janitorial and refurbishment support, transport of staff and equipment to the South Pole and Greenland, helium for balloons, food and accommodations for NOAA staff (year around) and utilities at both the South Pole and Summit. At the South Pole, this support began in 1956 and is now approaching \$1 million year.

NOAA will now need to provide support for the cost of transporting staff and supplies and a sizeable share of building replacement and maintenance to the South Pole and Greenland ABOs. These new costs to NOAA have been phased in and NOAA will assume full costs to the South Pole and Greenland ABOs beginning in FY 2015. Resources from other already struggling ABOs will have to be diverted to pay for these rising costs at South Pole and Greenland observatories. Similar issues are present at the ABO in Barrow, Alaska (AK) where the Department of Energy (DOE) in-kind assistance for infrastructure has been essential to help keep the site operational. Uncertain over future DOE contributions and NOAA deferred maintenance are two very large challenges at that site. The rapidly rising increases in annual operational costs, compounded by a drawback of cooperative support, has led to degraded operations and unsustainably deferred maintenance across all ABOs. This degradation now threatens these long-term, high-quality measurement records, which have a robust 50+ year-long history of sustained observations that remains timely and relevant today.

With increased funding, NOAA will ensure that all six observatories continue to provide the measurements necessary to document trends and distributions of atmospheric constituents influencing global climate, ozone depletion, and changes in baseline air quality for years to come. The present construct of this network, covering the hemispheric scale from north to south, is the minimum coverage required to monitor the global-scale trends, distributions, sources, and sinks of substances affecting human health and driving change in the Earth System.

This proposed funding will allow for the continued operation of all ABOs and the following specific improvements:

- Repair and modernization of infrastructure across all ABOs to limit the amount of downtime, increase safety, continue support for cooperative data collection with dozens of partners from different agencies and research institutions, increase data delivery efficiency, and continued enhancement for overall research effectiveness. Without this support, services will drop dramatically, data streams will be reduced in number and speed of delivery, and two of the six ABOs will be at-risk of near-term closure (FY 2016 or 2017).

- Enhanced ability for joint project undertaking with NOAA's 100+ partners, thus leveraging NOAA's costs and ensuring relevant data for the future. Without this additional funding, NOAA will not be able sustain many joint, long-term monitoring efforts; several have been terminated already.
- Continued delivery of ongoing data streams for substances such as carbon dioxide, methane, ozone, aerosols, and surface radiation for joint assimilation into meteorological and Earth-system models to improve weather forecasts, understand changes in the Earth-system, and provide objective verification of greenhouse gas (GHG) sources and sinks.
- Ability to address rapidly increasing costs of energy, maintenance, and operations at remote locations. Facing rapidly increasing change, NOAA's polar observatories are especially at risk with increasing costs of transport and other logistics falling to NOAA. Without additional resources, the increased costs to maintain operations at these increasingly important facilities would cause a reallocation of ABO resources that would dramatically reduce or terminate operations at other sites, e.g., Mauna Loa, Hawaii (HI).

Statement of Need and Economic Benefits:

The ABOs are world-class observing facilities that conduct 250 high quality measurements crucial to understanding atmospheric drivers of environmental change, national scale air quality, and ozone distributions and trends. NOAA's ABOs were the first to show the exponential global increase in GHGs in the late 1950s, confirm the appearance and growth of the Antarctic ozone hole, document the transport of Asian pollution to the U.S., and point to the manmade chemicals causing the ozone destruction (1980s). They also help ensure continued recovery of the stratospheric ozone layer under the U.S. Clean Air Act (1990) requirement to monitor and report on ozone and ozone-depleting gases covered in the Montreal Protocol (1987) and Clean Air Act. More recently, the Trinidad Head Observatory has been identifying atmospheric pollutants entering the western U.S. from burgeoning economies in Asia. As future environmental changes on Earth are unknown, yet will likely be significant in coming decades, the importance of continuing these high quality observations persists.

The ABOs have a long-standing record of quality and duration. The measurement of trends in global atmospheric gas concentrations was one of the first capabilities globally to quantify such changes with broad effects on the Earth system, including measurements of long-range transport of pollutants. Today, two of several unique products providing valuable tracking information are the NOAA Annual Greenhouse Gas Index (AGGI) and the Ozone Depleting Gas Index (ODGI). As Earth's environment changes, the nexus of environmental stress and globalization will alter the economic, political, and resource landscape of today's world. U.S. security depends on the ability to ascertain and respond to environmental change. The ABOs provide the historical context as well as trending and magnitude of those changes and serve as the basis for understanding and predicting the degree of change in the future.

Data provided by the ABOs is used by more than 500 partners and stakeholders, including international organizations, universities, other Federal agencies, and public and private organizations. ABO data sets have been cited in thousands of peer-reviewed research papers since their inception and are fundamental components of national and international assessments. For example, the steadily rising, 50+ year-long carbon dioxide record from Mauna Loa – known as the Keeling curve, along with other greenhouse gases, black carbon, and aerosols, form the basis for understanding our changing climate. Sustaining these long-term records is essential for understanding changes in the Earth System and is necessary for international negotiations and national decisions on climate, ozone-depletion, and air quality.

NOAA's ABOs – Barrow, AK (established 1973); Trinidad Head, CA (2001); Mauna Loa, HI (1956); American Samoa (1974); South Pole, Antarctica (1956) and Summit, Greenland (2001) – are the backbone of NOAA's efforts to monitor the constituents that influence global climate change, ozone-

depletion, global pollutant transport, and baseline air quality. The ABO sites were chosen specifically to cover a “pole-to-pole grid” at sites representative of the atmosphere in each regional location. For example, Barrow, AK was established to cover the Arctic; Mauna Loa, HI measures the northern mid-latitudes where the air is pure; Samoa, AS covers the southern mid-latitudes; and the South Pole measures the Antarctic. These four form the backbone of regional air measurements. Added slightly later in 2001, the Trinidad Head, CA site was set up to measure the increasing inflow of ozone pollutants and greenhouse gases from Asia into the western U.S.; and Summit, Greenland was established in the same year to measure U.S. and European pollutants flowing into the Arctic. The six sites in tandem form a well-linked network, yet each has a distinctive role to play. One sample scientific highlight from each ABO includes:

- Barrow, AK measures surface ozone destruction and captured the extent of atmospheric mercury deposition into the Arctic food chain carried into the Arctic from industrialized nations;
- Mauna Loa, HI is famous for the Keeling curve and the discovery of the steady increase in the most important greenhouse gas - carbon dioxide;
- Trinidad Head, CA measured large inflows of ozone effluents from Asia to the U.S. that are affecting the background ozone levels in California;
- Samoa, in American Samoa, has captured large differences in concentration of greenhouse gases between the northern and southern hemispheres;
- South Pole, is well known as the site for the Antarctic Ozone Hole and recovery measurements;
- Summit, Greenland has documented episodic injections of large blobs of European air pollutants containing black carbon and ozone that have wafted into the Arctic.

Resource Assessment:

The resources for this activity are described in the Climate Research narrative. In order to provide the most efficient observational coverage, the ABO sites were chosen specifically to cover a “pole-to-pole grid” at sites representative of the atmosphere in each regional location, allowing for fewer number of sites providing maximum benefit. The requested resources in FY 2016 are needed to continue to support NOAA’s 50+ year effort of sustained observations and research.

Schedule and Milestones:

FY 2016

- Address the most significant infrastructure needs and replace aging equipment and data delivery systems
- Incorporate a portion of additional logistical responsibilities formerly provided by other agencies

FY 2017

- Introduce upgrades in renewable energy at American Samoa and Mauna Loa for long term sustainability, reduced costs, and efficiency
- Continue to address infrastructure concerns across all ABOs
- Improve infrastructure and facilities at Trinidad Head to ensure long-term monitoring of pollutants from Asia

FY 2018 - 2020

- Improve measurement programs at Barrow and Summit ABOs for monitoring and understanding the increasingly diverse and rapid changes in the Arctic

Deliverables:

- High quality measurements of greenhouse gases, aerosols, halocarbons, ozone, and solar radiation at the six baseline stations such that data collected in the next decade will be completely compatible with existing records and future measurements

- Refreshed instrumentation and address infrastructure concerns
- Improve measurement efficiency, energy conservation, and safety at all ABOs
- Expanded measurements at the Summit, Greenland, observatory to better monitor arctic processes and air pollution, especially black carbon entering the Arctic from Europe
- Cooperative methane monitoring sites in central Alaska to monitor increasing methane out-gassing in these permafrost peat rich areas
- Improved capability of aerosol instrumentation, methane and other non-CO2 measurements, total ozone, solar radiation, and stratospheric lidar instrumentation at all observatories
- Near-real time data streams to support weather and climate analyses and model development

Performance Goals and Measurement Data:

Performance Measure:	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
Globally Distributed Manned Atmospheric Baseline Observatories (# of sites that monitor 200+ atmospheric parameters)							
With Increase	N/A	N/A	6	6	6	6	6
Without Increase	4	4	4	3	2	2	2
Description: Four out of six NOAA Atmospheric Baseline Observatories currently have the capability to monitor the full suite of 200+ atmospheric parameters. With an increase of support, all six can be brought up to the full monitoring suite. Without an increase, a reduction in capability and capacity will be required at two ABOs.							

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: Office of Oceanic and Atmospheric Research
Sub-program: Climate Research
Program Change: Atmospheric Baseline Observatories

Object Class		FY 2016 Increase	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$23,314
11.3	Other than full-time permanent	0	899
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	0	24,213
12	Civilian personnel benefits	0	6844
13	Benefits for former personnel	0	123
21	Travel and transportation of persons	30	940
22	Transportation of things	45	741
23.1	Rental payments to GSA	0	959
23.2	Rental Payments to others	0	706
23.3	Communications, utilities and miscellaneous charges	20	1001
24	Printing and reproduction	0	142
25.1	Advisory and assistance services	0	951
25.2	Other services	550	4,134
25.3	Purchases of goods & services from Gov't accounts	0	5,705
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	70
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	750	812
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	500	3,506
31	Equipment	600	2,066
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	505	11,165
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	3,000	64,078

Due to financial system limitations, the object class detail for the Program reflects the Climate Labs and CIs PPA.

Climate Laboratories and Cooperative Institutes: U.S. Global Change Research Program (Base Funding: \$61,078,000 and 192 FTE; Program Change: \$ 3,440,000 and 1 FTE): NOAA requests an increase of \$ 3,440,000 and 1 FTE for a total of \$ 64,518,000 and 193 FTE to support the U.S. Global Change Research Program's priority research areas. This work will focus on expanding NOAA's capabilities for improved understanding of weather and climate extremes and marine ecosystem tipping points.

Proposed Actions:

Extremes Research: Extreme climate and weather events such as heat waves, droughts, and floods can profoundly affect society and the environment, resulting in loss of life, property, and natural habitat. Building on recent investments, this increase will further NOAA's capability to explain and predict high-impact weather and climate events by providing new information products to support policy development, decision-making, and resource management. These information products will allow decision makers managing coastal, marine, water, and other critical resources to have timely access to the best available information in order to understand risks related to extreme events in a varying and changing climate. NOAA will use the proposed funding to accelerate research advances to provide timely climate attribution assessments, climate predictability assessments, and the implementation of a global multi-model approach to resolve and to predict the behavior of extreme events.

Marine Ecosystem Tipping Point Research: Climate variability and change have major effects on marine ecosystems, living marine resources, and the people and economies that depend on them in the U.S. and globally. These climate-driven effects, in combination with non-climatic stressors, such as pollution, over-use, and habitat destruction, can lead to abrupt changes in structure, function, and valuable services of marine ecosystems. NOAA will use the proposed funding to accelerate the development and broaden the application of Earth System Models (ESMs) and other tools necessary for understanding where, when, and how marine ecosystems may reach critical tipping points or abrupt major that could significantly affect the communities involved in the seafood industry, coastal tourism and recreation, and other ocean-dependent industries. Some specific target areas for these efforts include

- Applying high-resolution ESMs to assess past and future marine ecosystem variability at regional scales;
- Use data assimilation to improve retrospective analyses of seasonal to decadal shifts in U.S. marine ecosystem productivity, structure, and function;
- Developing a prototype seasonal-to-interannual prediction system of future marine ecosystem variability;
- Developing indices of marine ecosystem condition to better track, assess, and provide early-warning of possible tipping points in US marine ecosystems; and
- Enhanced ESM capabilities for understanding, predicting, and projecting ocean acidification.

Statement of Need and Economic Benefits:

It is essential that the Nation have solid infrastructure for observations, research on extremes, and predictive modeling so policy makers can have the best tools in hand for decision making on local, regional, and national scales.

Extremes Research - Without knowledge of the background conditions and processes leading to extreme climate and weather events, policy and decision makers cannot make informed decisions concerning how society should invest in critical infrastructure in risk-prone areas. Since 1980 the U.S. has experienced 170 billion-dollar extreme climate and weather events (e.g., heat wave, droughts, wildfire, and floods) with an estimated total cost to the economy of \$1 trillion dollars. In the past three

years alone, the U.S. have experienced over 25 billion-dollar extreme events such as Hurricane Sandy and extreme drought events such as those in California. This increase will expand NOAA's capability to advance the understanding and predictability of weather and climate extremes that is becoming increasingly critical to meet private and public sector demands for information on extreme events for early warning and to inform preparedness.

Marine Ecosystem Tipping Point Research - An estimated 4 million metric tons of fish and shellfish are harvested in the United States each year³. The commercial catch is valued at 4 billion dollars, supports 1 million jobs, and yields over 32 billion dollars in industry-wide income⁴. Marine ecosystems support recreational fisheries estimated to have a total economic impact of \$73 billion and over 300,000 additional jobs⁵. Healthy ecosystems also play a key role in sustaining broader coastal tourism activities. In contrast, the global costs to society of degraded ocean conditions and inadequate management of marine resources include \$50 billion a year for overfishing, \$200 to \$790 billion a year for hypoxia (oxygen deficiency), \$10 to \$90 billion a year for invasive species, and \$104 to \$182 billion a year for ocean acidification⁶. The potential for rapid ecosystem state changes or tipping points presents a threat to sustainable management of marine resources. Stakeholders such as regional fisheries managers, fishermen, and the multi-sectoral seafood industry are demanding improved information on the causes of observed changes to living marine resources, whether past changes are indicative of future conditions, and what, where, when and how tipping points might be experienced in these systems. This research effort leverages NOAA's capabilities in high-resolution modeling, pelagic ecosystem modeling, data assimilation, observation systems for ocean physical and biological conditions (e.g., fish stock surveys), and numerous interdisciplinary collaborations with partners across NOAA and in academia to better understand, anticipate, prepare for, and respond to possible marine ecosystem tipping points in a changing climate. These activities are crucial to strengthening marine resource management by developing decision-support tools and other resources to incorporate climate-related information into marine resource management.

Resource Assessment:

The resources for this activity are described in the Climate Laboratories and Cooperative Institutes narrative.

Schedule and Milestones:

Extremes Research

FY 2016

- Triple the number of climate model simulations available to resolve high impact extreme events to address full frequency distribution with statistical robustness, such as 1 in 100 year events

FY 2017

- Produce timely and credible explanations of evolving extreme climate and weather events

³ National Marine Fisheries Service, National Oceanic and Atmospheric Administration. 2011b. Annual Commercial Landing Statistics. http://www.st.nmfs.noaa.gov/st1/commercial/landings/annual_landings.html (accessed September 20, 2011)

⁴ National Marine Fisheries Service, National Oceanic and Atmospheric Administration. 2011c. Fisheries Economics of the U.S., 2009. http://www.st.nmfs.noaa.gov/st5/publication/fisheries_economics_2009.html (accessed September 20, 2011)

⁵ National Marine Fisheries Service, National Oceanic and Atmospheric Administration. 2011c. Fisheries Economics of the U.S., 2009. http://www.st.nmfs.noaa.gov/st5/publication/fisheries_economics_2009.html (accessed September 20, 2011)

⁶ Global costs: Hudson, A. and Y. Glemarec, 2012: Catalysing Ocean Finance Volume I Transforming Markets to Restore and Protect the Global Ocean, United Nations Development Programme and Global Environment Facility, New York, NY and Washington, DC

FY 2018

- Double, relative to a 2016 baseline, the annual number of assessments the causes and predictability of observed extreme climate and weather events, anomalies, and trends

FY 2019

- Reduce, relative to a 2016 baseline, the lag time by 50 percent between when a climate or weather extreme event occurred and the completion of the assessments of causes and predictability

FY 2020

- Prototype an extreme climate and weather assessment delivery system to inform preparedness and manage future risk by providing systematic explanations of high-impact extreme events that are readily understandable and immediately available to support decision making.

Marine Ecosystem Tipping Point Research

FY 2016

- Delivery of global high-resolution prototype ocean simulation of retrospective analysis multi-decadal marine ecosystem variability integrated with data-assimilative physics

FY 2017

- Development of a global high-resolution prototype seasonal-to-interannual prediction system of future marine ecosystem variability

FY 2018

- Implementation of an experimental global high-resolution prototype seasonal-to-interannual prediction system of future marine ecosystem variability, including estuarine, coastal, and benthic ecosystems

FY2019

- Comprehensive assessment of the fidelity (skill and reliability) of the global high-resolution prototype seasonal-to-interannual prediction system

FY 2020

- Experimental implementation of a high-resolution, integrated regional information system to provide information on oceanographic conditions and critical thresholds tailored to support regional ecosystem-based management activities

Deliverables:

Extremes Research

- Model-based diagnostic capabilities to resolve and predict the behavior of high-impact climate and weather extreme events
- Reliable, authoritative, routine and systematic explanations of the causes, predictability and likelihood of observed high-impact extreme climate and weather events for risk assessment and management decisions

Marine Ecosystem Tipping Point Research

- Peer-reviewed publications demonstrating improved scientific understanding of the linkages between a changing climate and its impact on marine ecosystems
- A global climate modeling capability to provide predictions and projections of marine ecosystem change, including potential tipping points, that delivers the best available science for guidance and early warning to inform resource management
- High-resolution, regional information on the evolution of oceanographic conditions and critical thresholds tailored to support regional ecosystem-based management activities

Performance Measures:

Extremes Research:

Performance Measure:	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
Reduce lag time between climate and weather extreme events; assessment of their causes in order to improve timeliness of climate intelligence that can inform decision-making and risk management.							
With increase	N/A	N/A	7 months	6 months	5 months	3 months	3 months
Without increase	12 months	11 months	8-10 months	8-10 months	6-8 months	6-8 months	6-8 months
Description: Increasingly timely scientific explanations for the causes of climate and weather extreme events, which clarify which aspects of high impact extreme events are attributable to natural or to human causes, are needed to meet decision making timeframes for risk management, adaptation and policy responses.							

Performance Measure:	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
Cumulative number of climate model simulations used to assess changes in extremes							
With increase	N/A	N/A	360	420	480	540	600
Without increase	N/A	60	120	180	240	360	420
Description: A fully populated, continuously updated, multi-model, multi-representative concentration pathway emission scenarios, super-ensemble diagnostic modeling capability for climate assessments will advance NOAA's mission to develop scientific capabilities in order to provide a continuous delivery of knowledge and information for climate attribution and predictability assessments.							

	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
Number of attribution and predictability assessments of extreme weather and climate events, anomalies, and trends							
With increase	N/A	N/A	8	8	10	10	11
Without increase	3	4	5	5	6	6	7
Description: Outlooks on seasonal to interannual timescales of high impact climate and weather extreme events for droughts, floods, heatwaves and cold outbreaks that are comparable to the existing NOAA hurricane season outlook annual and midseason update.							

Marine Ecosystem Tipping Point Research:

Performance Measure: Publically available and useful marine ecosystem predictions and projections (cumulative number)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	350	500	650	800	1000
Without Increase	128	200	270	320	400	500	500
Description: Predictions and projections of marine ecosystem change, including potential tipping points, can provide insight and early warning to inform resource management. Ensuring that the information, products, models, and services developed are made widely available and usable will enhance the integration of best-available science into decision-making processes.							

Performance Measure: Peer-reviewed journal articles (cumulative number)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	22	32	42	52	62
Without Increase	8	12	18	24	30	36	42
Description: These publications provide the information needed by stakeholders, resource managers, and decision-makers to develop effective policies and adaptation strategies for climate impacts on marine ecosystems.							

Performance Measure: Contributions to assessments relevant to regional ecosystem-based management activities in the U.S.	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	6	6	8	8	10
Without Increase	2	2	3	3	4	4	5
Description: Regional scale projections will contribute to international assessments (e.g. IPCC AR5, released in 2013), national assessments under the U.S. Global Climate Research Program, and other assessments as requested. The number of meaningful regional projections possible will increase as NOAA's Earth System Model increases in realism and complexity. Examples of regional scale projections include: regional sea level rise projections that require explicit representation of the global eddy field in the ocean models; projections of parameters essential to ocean and coastal ecosystem forecasting; assessment of regional carbon budgets; and projections of climate change in the Arctic region that require improved sea ice models.							

PROGRAM CHANGE PERSONNEL DETAIL

Budget Program: Office of Oceanic and Atmospheric Research
Sub-program: Climate Research
Program Change: U.S. Global Change Research Program

Title:	Location	Grade	Number of Positions	Annual Salary	Total Salaries
Physical Scientist	Boulder, CO	ZP-IV	1	88,693	88,693
Subtotal			<u>1</u>		<u>\$88,693</u>
Less Lapse	25%		<u>0</u>		<u>(\$22,173)</u>
Total Full-time permanent:			1		\$66,520
2016 Pay Adjustment	1.3%				\$865
TOTAL			1		\$67,385
Personnel Data			Number		
Full-time Equivalent Employment					
Full-time permanent			1		
Other than full-time permanent			0		
Total			<u>1</u>		
Authorized Positions:					
Full-time permanent			1		
Other than full-time permanent			0		
Total			<u>1</u>		

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: Office of Oceanic and Atmospheric Research
Sub-program: Climate Research
Program Change: USGCRP

Object Class	FY 2016 Increase	FY 2016 Total Program
11 Personnel compensation		
11.1 Full-time permanent	\$67	\$23,431
11.3 Other than full-time permanent	0	899
11.5 Other personnel compensation	0	0
11.8 Special personnel services payments	0	0
11.9 Total personnel compensation	67	24,330
12 Civilian personnel benefits	40	6844
13 Benefits for former personnel	0	123
21 Travel and transportation of persons	30	940
22 Transportation of things	0	696
23.1 Rental payments to GSA	0	959
23.2 Rental Payments to others	0	706
23.3 Communications, utilities and miscellaneous charges	0	981
24 Printing and reproduction	0	142
25.1 Advisory and assistance services	0	951
25.2 Other services	450	3,622
25.3 Purchases of goods & services from Gov't accounts	0	5,705
25.4 Operation and maintenance of facilities	0	0
25.5 Research and development contracts	150	220
25.6 Medical care	0	0
25.7 Operation and maintenance of equipment	0	0
25.8 Subsistence and support of persons	0	0
26 Supplies and materials	0	2,756
31 Equipment	0	1,216
32 Lands and structures	0	0
33 Investments and loans	0	0
41 Grants, subsidies and contributions	2,703	14,327
42 Insurance claims and indemnities	0	0
43 Interest and dividends	0	0
44 Refunds	0	0
99 Total obligations	3,440	64,518

Climate Laboratories and Cooperative Institutes: Greenhouse Gas Monitoring (Base Funding: \$61,078,000 and 192 FTE; Program Change: \$2,975,000 and + 1 FTE): NOAA requests an increase of \$2,975,000 and 1 FTE for a total of \$ 64,053,000 and 193 FTE to enhance and sustain an observation and analysis system necessary to determine uptake and emissions of carbon dioxide and greenhouse gases (GHGs) across North America.

Proposed Actions:

NOAA will build upon its North American Carbon Observation and Analysis System (COAS) to establish a more robust network of sensors and carbon cycle modeling efforts in conjunction with CarbonTracker. This will be part of an effort to develop an Integrated Global Greenhouse Gas Information System (IGIS) with partnering agencies and institutions to support global connectivity of observing and information systems.

The network of sensors will target measurements of atmospheric composition of gases including carbon dioxide (CO₂) and its isotopes (¹³C, ¹⁴C), methane (CH₄), nitrous oxide (N₂O), and the full suite of chlorofluorocarbon (CFC) replacements. The enhanced network will allow for: increased understanding of the carbon cycle, continuing necessary measurement resolution between ocean and land-based contributions, determining precise subcontinental-scale continental uptake and emission of carbon by the Earth System, modernizing instrumentation and analytical techniques, improving Earth System and carbon models, and validating retrievals by emerging satellite-techniques.

The enhanced network will also contribute substantially to on-going national efforts for carbon cycle science through the USGCRP North American Carbon Program (NACP) in coordination with twelve other agencies (<http://www.carboncyclescience.gov/>). The enhanced observing and analysis system will serve as a model for other nations and regions across the world in their efforts to understand the Earth System's atmospheric composition dynamics and how humans interact with it. Further, inputs from this network integrate into national security and treaty discussions regarding global greenhouse gases.

Specifically, this effort will increase the number of locations and frequency of NOAA's high quality carbon observations in the atmosphere and expand the suite of gas measurements provided routinely from ground-based and tower platforms to include methane, carbon isotopes (e.g., ¹⁴C, ¹³C), CFC replacements, and additional tracers. The expanded tower network will be a joint venture with private industry and the increase to isotope measurements will occur in partnership with NOAA's Cooperative Institute program and others.

Statement of Need and Economic Benefits:

Most states and numerous regions, cities, and businesses in the United States have developed and enacted plans for managing GHG emissions, including: California, Maryland, Oklahoma, Mississippi, the Regional Greenhouse Gas Initiative for nine Northeastern States, cities in every state across the country, and businesses both in and out of the power sector. Managers and policy makers at all levels will want to gauge GHG emissions policy effectiveness. Accurate atmospheric monitoring information provides that capability.

During the previous development of large-scale emission reduction approaches (e.g., international, national, state), it became clear that they do not succeed without consistent, independent, scientific monitoring to support verification and policy decisions (e.g., ozone depletion, acid rain, air quality in large cities and regions). For greenhouse gases, high quality, coordinated atmospheric observational information ensures success in these efforts and informs the managers and policy-makers implementing them. The ability of the United States and other

nations to implement policies that effectively limit atmospheric GHG concentrations will depend upon their ability to monitor their progress and determine what strategies are or are not working in modifying GHG concentrations. These atmospheric observations will be at the core of all analyses, predictions, and plans going into the future and it is essential that they be comprehensive and of the highest quality.

Resource Assessment:

NOAA's Global Monitoring Division, in partnership with CIRES and other stakeholders, conducts sustained observations and research toward understanding the global distributions, trends, sources, and sinks of atmospheric constituents that are capable of forcing change in Earth's climate and environment. For more information on the resources associated with these activities, see the Climate Research narrative.

Schedule and Milestones:

FY 2016

- Issue grant to acquire an accelerator mass spectrometer (AMS) optimized for ^{14}C measurements. Lead-time from order: ~ 2 years
- Contract construction of 50 automated air sampling packages over two years (proven design, 12 samples in each package) to create the capacity for taking the additional samples from which CO_2 will be extracted for ^{14}C measurements
- Increase sample extraction and processing infrastructure capacity to prepare samples for AMS measurements
- Expand carbon monitoring network by 4 medium height towers
- Increase data management infrastructure

FY 2017

- Continue grant actions for accelerator mass spectrometer (AMS)
- Collect and measure 2,000 $^{14}\text{CO}_2$ samples
- Expand network by 2 medium height towers

FY 2018

- Begin full time operation of accelerator mass spectrometer (AMS)
- Collect and measure 3,500 $^{14}\text{CO}_2$ samples
- Expand network by 2 additional medium height towers

FY 2019-2020

- Measure 5,000 $^{14}\text{CO}_2$ samples
- Enhance and upgrade instrumentation at all tower sites

Deliverables:

- A total of 16 Tall and medium height towers (8 NOAA, 8 Industry) measuring the full suite of greenhouse gases continuously across North America by 2020
- Satellite retrieval verification capability in place with expanded sampling and tower coverage
- Fully operating accelerator mass spectrometer (AMS)
- On-going $^{14}\text{CO}_2$ measurements at +70 sites

Performance Goals and Measurement Data:

Performance Goal:	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
Uncertainty of the North American carbon sink to better understand the contribution of human activities toward increasing atmospheric carbon dioxide and methane (million tons carbon/year) (Measure 3.1f)							
With Increase	N/A	N/A	395	390	385	380	375
Without Increase	405	410	405	400	400	390	385

Description: Please see measure description under the Annual Performance Plan (APP) under section Targets and Performance Summary.

Performance Measure:	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
Number of sites supporting frequent ¹⁴ CO ₂ Measurements							
With Increase	N/A	N/A	12	45	60	65	70
Without Increase	12	12	12	12	12	12	12

Description: The number of sites sampled represents NOAA's capacity to attribute emissions to both regions and economic sectors, predominantly within North America. While NOAA analyzes for CO₂ and many greenhouse gases at all sites, samples are currently collected for C-14 analysis at only 12 of these. With more sites, smaller regions can be targeted. These sites include tall towers and weekly aircraft profiles.

Performance Measure:	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
Number of samples extracted per year for ¹⁴ CO ₂ analyses							
With Increase	N/A	N/A	2,000	2,000	3,500	5,000	5,000
Without Increase	700	700	700	700	700	700	700
Description This measure represents NOAA's capacity to evaluate fossil fuel vs. "natural" emissions in both space and time. With samples collected more frequently from a larger number of sites, NOAA will be able to provide needed information on policy-relevant scales. Samples to be analyzed by AMS first require extraction, a meticulous process involving several steps. Extraction capacity will be increased even before the AMS is acquired, as, once extracted, samples can be safely stored before analysis. This allows the measurement record to begin even before the analytical capacity is fully developed.							

PROGRAM CHANGE PERSONNEL DETAIL

Budget Program: Office of Oceanic and Atmospheric Research
Sub-program: Climate Research
Program Change: Greenhouse Gas Monitoring

<u>Title:</u>	<u>Location</u>	<u>Grade</u>	<u>Number of Positions</u>	<u>Annual Salary</u>	<u>Total Salaries</u>
Physical Scientist	Boulder, CO	ZP-IV	1	88,693	88,693
Subtotal			<u>1</u>		<u>\$88,693</u>
Less Lapse	25%		<u>0</u>		<u>(\$22,173)</u>
Total Full-time permanent:			1		\$66,520
2016 Pay Adjustment	1.3%				\$865
TOTAL			1		\$67,385
<u>Personnel Data</u>			<u>Number</u>		
Full-time Equivalent Employment					
Full-time permanent			1		
Other than full-time permanent			<u>0</u>		
Total			1		
Authorized Positions:					
Full-time permanent			1		
Other than full-time permanent			<u>0</u>		
Total			1		

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: Office of Oceanic and Atmospheric Research
Sub-program: Climate Research
Program Change: Greenhouse Gas Monitoring

Object Class		FY 2016 Increase	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	\$67	\$23,580
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	899
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	67	24,479
12	Civilian personnel benefits	23	6,121
13	Benefits for former personnel	0	109
21	Travel and transportation of persons	15	849
22	Transportation of things	20	682
23.1	Rental payments to GSA	0	848
23.2	Rental Payments to others	15	1,022
23.3	Communications, utilities and miscellaneous charges	5	912
24	Printing and reproduction	0	126
25.1	Advisory and assistance services	0	841
25.2	Other services	0	2,673
25.3	Purchases of goods & services from Gov't accounts	0	5,046
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	62
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	1,000	2,850
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	2,437
31	Equipment	495	1,871
32	Lands and structures	0	0
33	Investments and loans	0	3,135
41	Grants, subsidies and contributions	1,335	9,990
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	2,975	64,053

Regional Climate Data and Information: Arctic Observing Network (Base Funding: \$3,156,000 and 1 FTE; Program Change: +\$2,190,000 and 1 FTE: NOAA requests an increase of \$2,190,000 and 1 FTE for a total of \$5,346,000 and 2 FTE to support northward development of NOAA's Arctic Observing Network. It will also enable the development of observation-based Arctic informational products, including future scenarios of Arctic Ocean changes, sea-ice extent, ecosystem evolution, and Arctic to mid-latitude weather/climate linkages.

Proposed Actions:

OAR leads the NOAA Arctic Observing Network, which uses multiple observing tools and techniques and is on the frontlines for gathering information from which NOAA can monitor environmental change. NOAA will work with other Federal agencies, countries of the Arctic Council, and countries who participate in the Pacific Arctic Group (PAG) to develop observations north of the Chukchi Sea in the high Pacific Arctic. The high Pacific Arctic is an area where increased storminess has led to more waves and more mixing of the ocean water, which brings up colder water from beneath the surface, in turn changing air currents. Understanding the role that this flow plays on changing ecosystems and changing weather patterns in the northern latitude is the main goal of the multinational undertaking during the next five years. Full ocean depth moorings will be deployed to monitor changes in currents, fluxes, of heat, fresh water, nutrients, and marine life. In addition, atmospheric shipboard observations of radiative properties and other atmospheric information will provide information on the coupled ocean-ice-atmosphere, which is critical for weather prediction efforts in the World Meteorological Organization (WMO), Polar Prediction Project. OAR's information additionally supports NMFS efforts to implement a distributed biological observatory to monitor biological response to environmental changes (see NMFS Fisheries and Ecosystem Science Programs and Services: Distributed Biological Observatory, p.57.)

The proposed actions are to:

- Fill in critical observation gaps in the warming Pacific Arctic, that are thought to be a critical key to understanding linkages between heat flux changes in the Arctic and impacts on the mid-latitude. Data will need to be transitioned to both National networks and to Arctic Council networks to respond to data information needs.
- Develop information products based on ongoing observations.
- Expand observation-based synthesis contributions to the Arctic Research Program (ARP) Arctic Report Card.
- Provide new data to support NOAA's contribution to the World Climate Research Programme (WCRP) Polar Prediction Project.
- Further develop NOAA's Arctic Research Program's contribution to the U.S. Arctic Observing Network, and the Arctic Council's Sustaining Arctic Observing Network. NOAA will seek and strengthen partnerships with Korea, China, Japan, Russia, Canada, the Arctic Council, National Science Foundation, Office of Naval Research, Department of Interior and NASA to carry out this program.

The ARP has engaged the Alaska Ocean Observing System (AOOS) to house the nodes for the Distributed Biological Observatory, the Russian-American Long-term Census of the Arctic (RUSALCA) program data, and the newly developing Arctic Council contributions for the Circumpolar Marine Biodiversity Monitoring Program. Funds are requested to maintain and grow this Pacific Arctic data repository as a U.S. contribution to both internal and external Arctic Council working group needs.

Statement of Need and Economic Benefits:

Over the last 12 years, through direct investment and interagency/international partnerships, the ARP has built a considerable Arctic observation capacity, including regular ship surveys of the ecosystems and physical oceanography in the Chukchi Sea, the Distributed Biological Observatory adjacent to Arctic Alaska, a pan-Arctic ring of sentinel Atmospheric Observatories, and the International Arctic Buoy and Ice Mass Balance Programs. Following a review of the program in 2013, and agreements with partner agencies and countries, the ARP is planning a strategic move during 2015-2020 northward in the Pacific Arctic, a region where waters from the Pacific and Arctic are interacting with, affecting sea-ice, and responding to radiative forcing from the atmosphere.

Resource Assessment:

Resources for this activity are described in the Regional Climate Data and Information narrative.

Schedules and Milestones:

FY 2016 - 2017

- Carry out initial expedition to the high Pacific Arctic with Japan, China, Canada, Korea, Russia and other Arctic Council countries to build the Pacific Arctic Climate Observing System
- Continue to contribute data to the Alaska Ocean Observing System and other national data archives including the NGDC and NSIDC
- Sync data sharing between vessels, other platforms
- Provide baseline data that will inform issues of Arctic change including future scenarios of Arctic Ocean heat flux changes, sea-ice extent, ecosystem evolution, Arctic to mid-latitude weather/climate linkages and human health.

FY 2017

- Carry out the RUSALCA expedition repeat transects in the Chukchi Sea
- Process and analyze data obtained in 2016
- Plan for the 2018 expedition
- Release data to the AOOS, NSIDC for access by stakeholders
- Coordinate with partners data exchanges, support observation-modeling workshops through the Pacific Arctic Group

FY 2018 - 2019

- Launch the second Pacific Arctic Climate Observing System expedition
- Coordinate data exchanges
- Review observations and revise survey based on what we learned during the expedition in 2016

FY 2020

- Carry out the third Pacific Arctic climate Observing System expedition
- Prepare a synthesis of information learned
- Share data internationally and with the Arctic Council via the Arctic Portal

Deliverables:

- Multiple observations of the Pacific Arctic
- Increased knowledge and characterization of critical processes determining Arctic Ocean mixing, sea-ice extent, mid-latitude weather extremes, and marine ecosystems changes
- Provision of ARP data and products via AOOS portal and other centers
- Additional and improved syntheses within the annual Arctic Report Card
- Improvements in the Sea Ice Outlook annual report

- Model-data fusion workshops- both regional and northern hemisphere, to increase uptake of observational information within models and forecast systems
- Interoperable Interface Design & Programming
- Data service system integration & programming

Performance Goals and Measurement Data:

Performance Measure:	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
Increase the number of Arctic system products needed to clarify the causes and consequences of Pacific Water influx into the Arctic Ocean							
With Increase	N/A	N/A	10	15	15	17	17
Without Increase	10	20	10	10	10	10	10
Description: This performance measure describes the increase in the number of value-added products (based on observations) describing the changes in time of Pacific and Atlantic water fluxes in the Pacific sector of the Arctic Ocean region. Monitoring these fluxes is important to understand the variability of sea-ice extent and volume and the consequent physical and ecosystem changes occurring in the Arctic. These include data sets useful for mid-latitude modelers, data that can be assimilated into sea ice ecosystem models and information that will allow the community to create benchmark maps of marine life, currents, and fluxes in the changing Pacific Arctic Ocean. Data will be stored on the AOOS website and linked with the Arctic Council's pan-Arctic monitoring programs. During FY 2015 the decadal synthesis of RUSALCA observations will be published.							

Performance Measure:	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
Cumulative increase in number of baseline ecosystem transects and sentinel stations (e.g., Distributed Biological Observatory)							
With Increase	N/A	N/A	5	3	5	3	6
Without Increase	2	3	3	3	3	3	3
Description: This performance measure describes the increase in the number of transects/stations where standardized observations of marine ecosystems are recorded to monitor year-to-year variability.							

Performance Measure: Increase in number of new Observations data sets from the Pacific Arctic made available to NOAA (AOOS), the Pacific Arctic Group, and the Arctic Council working groups.	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	2	1	2	1	4
Without Increase	1	1	1	1	1	1	1
Description: This performance measure aims to show an ongoing increase in NOAA's contribution to carrying out its mission to deploy an Arctic Observing Network in key regions of the Pacific Arctic that are thought to be critical drivers of global change. The expected increase in transects will require the accumulation of funds from one year to the next to afford more high Arctic observing transects. These observations will be made available via the AOOS to the country, to the Pacific Arctic Group, to the Arctic Council Working group and to the Sustaining Arctic Observing Networks. The outcomes will strengthen informational links to stakeholders in the Arctic region.							

PROGRAM CHANGE PERSONNEL DETAIL

Budget Program: Office of Oceanic and Atmospheric Research
Sub-program: Climate Research
Program Change: Arctic Observing Network

Title:	Location	Grade	Number of Positions	Annual Salary	Total Salaries
Program Manager	Silver Spring, MD	ZP-IV	1	89,924	89,924
Physical Scientist	Seattle, WA	ZP-IV	1	88,179	88,179
Subtotal			<u>2</u>		<u>\$178,103</u>
Less Lapse	25%		<u>(1)</u>		<u>(\$44,526)</u>
Total Full-time permanent:			1		\$133,577
2016 Pay Adjustment	1.3%				\$1,737
TOTAL			1		\$135,314
Personnel Data			Number		
Full-time Equivalent Employment					
Full-time permanent			1		
Other than full-time permanent			0		
Total			<u>1</u>		
Authorized Positions:					
Full-time permanent			2		
Other than full-time permanent			0		
Total			<u>2</u>		

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: Office of Oceanic and Atmospheric Research
Sub-program: Climate Research
Program Change: Arctic Observing Network

Object Class		FY 2016 Increase	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	\$135	\$3,532
11.3	Other than full-time permanent	0	12
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	135	3,544
12	Civilian personnel benefits	34	1,005
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	20	516
22	Transportation of things	0	15
23.1	Rental payments to GSA	0	174
23.2	Rental Payments to others	0	120
23.3	Communications, utilities and miscellaneous charges	0	69
24	Printing and reproduction	0	3
25.1	Advisory and assistance services	0	763
25.2	Other services	0	6,870
25.3	Purchases of goods & services from Gov't accounts	0	12,441
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	120
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	1,178
31	Equipment	0	141
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	2,001	13,356
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	2,190	40,315

Due to financial system limitations, the object class detail for the Program reflects the Regional Climate Data and Information PPA.

Regional Climate Data and Information: Assessments (Base Funding: \$4,330,000 and 0 FTE; Program Change +\$3,970,000 and 0 FTE): NOAA requests an increase of \$3,970,000 and 0 FTE for a total of \$8,300,000 and 0 FTE to support a permanent capability to produce climate assessments at regional and national scales.

Proposed Actions:

This proposed investment will ensure that NOAA supports a robust assessment process and delivers science-based, high-value climate information to support decision for a wide range of audiences and key stakeholders. This will be accomplished by providing authoritative, relevant, accessible and useful assessments in a timely, sustained, and repeatable manner.

Requested funding will support science activities with existing inter-agency programs to develop the foundational scientific knowledge required for a sustained national climate assessment. Regular climate assessments are essential to ongoing efforts to understand what climate change means for the Nation and what services are necessary to allow for informed decision-making.

NOAA will enhance existing and engage in new activities to:

- Further develop and refine scenarios (e.g. future climate, regions, sea level, land use);
- Test and deploy a system of climate indicators beyond the FY 2014 pilot phase; and
- Undertake regional and sectoral research activities, including risk and vulnerability analyses, targeted to address key science questions and stakeholder needs identified from the 2014 National Assessment reports.

NOAA will also develop strategies to enhance collaboration between existing regional networks, within NOAA and with partners, in order to better coordinate scientific research on climate impacts and vulnerabilities across the U.S. and analyze new model results through the international Coupled Model Intercomparison Project Phase 5 (CMIP5) to inform regional assessments drawing from scientific excellence across the research community. In FY 2016, NOAA will analyze model performance in simulating regional climate variability and trends over North America, evaluate those efforts, and develop an understanding of how well regional climate processes are represented in CMIP models; the assessment community has a critical need for this information to inform assessments with solid scientific understanding.

NOAA will also continue to lead the technical support unit and further contribute to the interagency Global Change Information System. Investments in FY 2016 will build on work from prior years to support the development of a robust data access infrastructure for assessment datasets, prototyping the National Climate Assessment's commitment to transparency and traceability for assessment data and conclusions. In addition, a user-focused interface is planned for linking foundational assessment information with other tools and applications across the Government.

Statement of Need and Economic Benefit:

The Global Change Research Act of 1990 (GCRA) calls for the President (through a Federal interagency body) to prepare and submit to the Congress, on a periodic basis (at least every 4 years), an assessment which: 1) integrates, evaluates, and interprets the findings of the Federal interagency research effort and discusses the scientific uncertainties associated with such findings; 2) analyzes the effects of global change on the natural environment, agriculture, energy production and use, land and water resources, transportation, human health and welfare, human social systems, and biological diversity; and 3) analyzes current trends in global change, both human-induced and natural, and projects major trends for the subsequent 25 to 100 years. NOAA has the lead Federal role in the 2014 National Climate Assessment.

A sustained assessment process is called for in both the *National Global Change Research Plan: 2012-2021* (the strategic plan for the U.S. Global Change Research Program (USGCRP)) and *Preparing the Nation for Change: Building a Sustained National Climate Assessment Process* (the report of the Sustained Assessment Special Report (SASR) Workgroup of the NOAA-supported National Climate Assessment Development Advisory Committee (NCADAC)). It has the potential to build on current assessment activities across NOAA Line Offices to establish the standing capacity to provide periodic syntheses and assessment of foundational climate science, which can provide new scientific insights, identify knowledge gaps, serve as the basis for Federal policy, and provide a starting point for the development of tailored, contextualized information that is easy for stakeholders to use within their specific regional and sectoral decision contexts.

Regional and national assessments can meet an increasing range of demands for climate change decision support across the Nation. Building on the past two decades of experience, and pairing existing expertise with emerging capacity, NOAA will support a collaborative, participatory assessment process that engages scientists, government officials, businesses, and communities in the investigation of climate impacts and effective mitigation and adaptation.

Cumulatively, the assessments will contribute to ongoing efforts to understand what climate change means for the U.S. and what services are necessary to allow for informed decision making. Assessments will contribute to an objective basis for adaptation and mitigation strategies on a variety of temporal and spatial scales, primarily through the legislatively mandated National Climate Assessment and future international assessments such as the Intergovernmental Panel on Climate Change.

Climate assessments will help synthesize both operational and research elements of NOAA, and will build upon many existing NOAA resources and functions including research in the physical, biological, and social sciences, observing, data management, modeling and forecasting, education, and outreach. NOAA will also enhance its capabilities and tailor its products through partnerships with other Federal agencies, and the academic, public and private sectors.

Resource Assessment:

The resources for this activity are described in the Regional Climate Data and Information narrative.

Schedule and Milestones:

FY 2016

- Develop strategies to enhance collaboration between existing regional programs, within NOAA and with partners, in order to better coordinate scientific research on climate impacts and vulnerabilities across the U.S
- Deploy climate indicator system through the Global Change Information System. Support assessment product development for topical/regional issues of high priority to NOAA and its partners.
- Update regional projections from new model results
- Fund new research to assess national and regional climate impacts and vulnerabilities
- Improve and expand Global Change Information System to make data and information more fully available to a broad range of users

FY 2017

- Fund new research to assess national and regional climate impacts and vulnerabilities
- Initiate research to improve understanding of model performance in simulating climate processes that underlie projections including the development of relevant model metrics

- Improve and expand Global Change Information System to make data and information more fully available to a broad range of users
- Complete updates of existing regional and sectoral assessments
- Finalize process-level understanding of CMIP model performance to assessments community and set of associated metrics

FY 2018

- Complete updates of existing regional and sectoral assessments. Finalize process-level understanding of CMIP model performance to assessments community and set of associated metrics
- Complete assessments that will feed into the National Climate Assessment

Deliverables:

- Deploy the prototype version of the Global Change Information System, including pilot of climate indicator system
- Report on options for enhancing collaboration between existing regional programs, within NOAA and with partners, in order to better coordinate scientific research on climate impacts and vulnerabilities across the U.S
- Deploy next generation climate indicator system through the Global Change Information System
- Funded research is published in the peer-reviewed literature and reflected in assessment products
- Produce reviewable draft of the National Climate Assessment and update assessment content online. A technical report and journal publications on process-level performance of climate models for use by the assessment process
- Completion and publication of National Climate Assessment synthesis

Performance Goals and Measurement Data:

Performance Measure: Annual number of climate change related impacts, vulnerability, adaptation, or mitigation information topics addressed in the Assessments	FY 2014 Target	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	10	10	12	12	15
Without Increase	8	8	8	8	8	8	8
Description: This performance measure will demonstrate the role of formal climate change assessments in decisions to address climate change impacts by identifying the number of topics addressed in the assessments that are considered by business, government, or the public that affected decisions related to improved climate resilience. Information topics are based on the U.S. Global Change Research Program report, "Global Climate Change Impacts in the U.S." This measure will track the extent to which the USGCRP topical information items are used by industry, etc., to inform their key decisions on how to mitigate or adapt to climate change.							

Performance Measure: Number of new metrics developed and applied to evaluate CMIP projections for regional application by the assessments	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	1	3	5	7	9
Without Increase	N/A	N/A	0	0	0	0	0
Description: This performance measure will demonstrate how scientific investigations underpinning the development of projections, quantified by the number of processes evaluated in the CMIP models, will be used to inform the development of assessments.							

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Program: Office of Oceanic and Atmospheric Research
Sub-program: Climate Research
Program Change: Assessments

Object Class		FY 2016 Increase	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$3,397
11.3	Other than full-time permanent	0	12
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	0	3,409
12	Civilian personnel benefits	0	1,019
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	60	556
22	Transportation of things	0	15
23.1	Rental payments to GSA	0	174
23.2	Rental Payments to others	0	120
23.3	Communications, utilities and miscellaneous charges	0	69
24	Printing and reproduction	0	3
25.1	Advisory and assistance services	0	763
25.2	Other services	75	6,945
25.3	Purchases of goods & services from Gov't accounts	0	12,441
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	235	355
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	1,178
31	Equipment	0	141
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	3,600	14,907
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	3,970	42,095

Due to financial system limitations, the object class detail for the Program reflects the Regional Climate Data and Information PPA.

Regional Climate Data and Information: NOAA Climate.gov Portal (Base Funding: \$1,350,000 and 0 FTE; Program Change: +\$2,300,000 and +1 FTE): NOAA requests an increase of

\$2,300,000 and 1 FTE for a total of \$3,650,000 and 1 FTE to continue development of the Climate.gov Portal in support of the Climate Resilience Toolkit (CRT), which will provide public online access to actionable climate data, information, and tools to help communities plan for impacts of climate change. Specifically, NOAA will work with relevant agencies to improve the CRT, which will include a more intuitive and user-friendly interface for access to climate data, information and tools across the Federal government, as well as a climate literacy learning center for formal and informal educators.

Proposed Actions:

NOAA will work with its Federal partners to expand and evolve the Climate.gov Portal (www.climate.gov) into an interagency partnership, and to house the CRT at toolkit.climate.gov. NOAA will also ensure these efforts connect seamlessly with the larger government “Big Earth Data Initiative.” The main goal of Climate.gov is to help build a more “climate-smart” nation that better understands its climate-related risks and opportunities, and that has the tools and resources to make more informed decisions that reduce vulnerabilities to extreme events and make communities and businesses more resilient to climate-related impacts.

Version 1.0 of the CRT was published in November 2014, will be completed in collaboration with the Office of Science and Technology Policy (OSTP), the Council on Environmental Quality (CEQ), and the agencies in the U.S. Global Change Research Program. NOAA’s Climate Program Office contributed to building the CRT in FY 2014 and continues this support in FY 2015. NOAA anticipates completing the Phase 1 build of the CRT in Spring 2015, including starting to add climate projections in the Climate Explorer, after which NOAA will conduct an external evaluation of the site to measure and assess its use and usability, user satisfaction with and trust in its contents. With the proposed FY 2016 increase, NOAA anticipates completing development of version 2.0 the CRT based on findings from stakeholder engagements and an external evaluation of the site to measure and assess its use and usability, as well as user’s satisfaction with and trust in its contents. Working collaboratively with its interagency partners, NOAA will expand and enhance the scope and functionality of Climate.gov and the CRT in the following key ways:

1. Develop version 2.0 of the Climate Resilience Toolkit. This includes, but may not be limited to, actions to]:
 - A. Develop a mobile version of the CRT that is compatible with popular mobile devices (tablets and phones).
 - B. Enhance the Climate Explorer in three key ways:
 - a. Add the ability for users to define their own “thresholds” of extreme events, and to quickly and easily extract trends and statistical information based on the entire history of station observation data. For example, users may define an extreme high temperature as any value in the upper / lower 5% of the historical record; and they may wish to quickly determine if there is a trend in the number of extreme temperature values over time, which will help them for planning and management purposes.
 - b. We will also add a web-compatible client (called “GeoSession”) that allows Federal agencies, businesses and communities to share — interoperably and on-the-fly — map layers, time-series *in situ* data, and expertise via the Climate Explorer in real-time stakeholder engagements for knowledge- and capacity-building.
 - C. Expand the list of “Taking Action” case studies and geo-tag our entire library to make them accessible geospatially through the Climate Explorer.
 - D. Build and deploy version 2.0 of the Climate Widget to allow users to enter a given county or state name and retrieve graphs of weather and climate data for that location (e.g.,

temperature, precipitation, humidity, and others). This version will expand the Climate Widget's scope to be more interoperable with other agencies' data — such as USGS stream flow data and will be “married” to projection data for any given location.

- E. Certified online training courses tailored to teach professionals in particular sectors what data and tools are available and how to use them to manage their risks and opportunities. While work has begun in this area, this new initiative will expand NOAA's efforts to serve societal sectors not being adequately served today (agriculture, city planners, civil infrastructure, economists, energy utilities, fisheries managers, human healthcare providers, insurance companies, legal services, various entities in U.S. homeland security, tourism, transportation, and water utilities). These courses will be designed in partnership with professional societies and other entities that serve those sectors and will be integrated into learning progressions, designed to help people (non-scientists) in businesses and communities build their knowledge, skill, and capacity to where they can readily integrate climate science data and tools into their own workplaces.
 - F. Social media tools for science-based problem solving for societal benefit. The aim is to bring professionals together into an online forum that bridges over cultural, geographic, political and discipline barriers for interdisciplinary collaboration and knowledge sharing. While social media tools exist today, none exists specifically to support interdisciplinary science-based decision-making for climate resilience.
 - G. Stand up a National Help Desk for Climate Resilience to include personnel who will provide timely (<24 hours) answers and guidance to questions and requests for climate information and services that we receive from communities and businesses from across the Nation. Here, we envision cultivating a public-private partnership that helps seed commercially viable climate analyses and climate services provided by entrepreneurial businesses and organizations.
2. An on-demand Climate Literacy Learning Center for formal and informal educators to boost their climate literacy and capacity for incorporating climate science data and information into their jobs. NOAA will expand its partnership with the National Science Teachers Association (NSTA), other Federal science agencies, and relevant partners to provide on-demand professional learning resources and climate data for science teachers — mapped to grade and learning standards — with training on how to use these materials. This is a much-needed investment in our nation's “intellectual 401k,” aimed at producing a more-skilled workforce and climate-literate lifelong learners.

Statement of Need and Economic Benefits:

Societal interest in climate is growing, as indicated by the rising number and sophistication of the questions and requests for climate data and services submitted to NOAA in recent years. Every day, communities and businesses across the nation grapple with environmental challenges due to unusual or extreme climate and weather conditions. In 2011 and 2012, the U.S. experienced 25 climate- and weather-related disasters in which damages exceeded \$1 billion (\$115 billion total)⁷. People are going online seeking information to help them understand why these events are happening and to better prepare for them. From 2012 to 2013, for example, Climate.gov saw a 153 percent increase in site visits and a fourfold increase in questions about climate data for decision-making applications. Individuals and organizations are seeking easy access to credible climate science information from NOAA at finer geographic and time scales to help them manage climate-related risks and opportunities in their lives, jobs, and communities. However, users report having

⁷ NOAA NCDC "Billion Dollar Weather / Climate Disasters." Online at <https://www.ncdc.noaa.gov/billions/events>. (Accessed Jan. 30, 2014)

difficulty locating and using NOAA's online data products and services. Thus, resolving this online accessibility issue, and boosting users' capacity to understand and use our resources, will be the main outcomes of Climate.gov's efforts.

U.S. science teachers are only getting about a fourth of the professional learning they need every year to improve their practice⁸ — a critical shortfall given the expertise now demanded by the Next Generation Science Standards. This challenge is compounded by the fact that face-to-face teacher learning experiences alone do not address the scale or sustainability required to reach and teach the nation's 3.2 million science teachers. The Climate.gov online Climate Literacy Learning Center for formal and informal educators will provide immediacy, convenience, and access that educators want and need that would otherwise not exist. Multiple reports by the U.S. Dept. of Education substantiate the effectiveness and need for blended learning experiences — online and face-to-face.

Resource Assessment:

Resources for this activity are described in the Regional Data and Information narrative.

Schedules and Milestones:

FY 2016

- Begin version 2.0 development of the Climate Resilience Toolkit, incorporating lessons learned from the QoR evaluation
- Begin work on developing online learning progressions that offer certificates of completion, in partnership with other Federal science agencies and professional societies
- Add "GeoSession" capability to the Climate Explorer
- Begin development of Climate Widget v2.0 (based on user feedback)
- Begin Phase 1 development for the Climate Literacy Learning Center
- Launch Phase 1 of a National Help Desk for Climate Resilience
- Continue to expand the CRT's "Taking Action" library of case studies, and widen the scope to include case studies from state, local, and tribal communities and businesses
- Test and evaluate a model for stakeholder engagement, focused on building knowledge, skill, and capacity for using the CRT in resilience planning and implementation for businesses and communities

FY 2017

- Complete and launch version 2.0 of the CRT, with user friendly interface for mobile devices
- Publish first draft of sector-specific learning progressions
- Publish redesigned Climate Explorer, with ability for users to define their own extreme thresholds and with user friendly interface for mobile devices
- Publish advanced warnings (maps and graphs) of extreme heat and precipitation in Climate Explorer
- Launch version 2.0 of the Climate Widget
- Launch first draft of Climate Literacy Learning Center
- Begin evaluation of version 2.0 of the CRT
- Formulate plans and set targets for scaling up the number and reach of stakeholder engagements

FY 2018

- Complete the evaluation of CRT version 2.0 and begin version 3.0 refinements and developments, based on user feedback

⁸ Pasley, Joan D. (2011): "Perspectives on Deepening Teachers' Mathematics and Science Content Knowledge." Horizon Research, Inc. White paper online at <http://www.mspkmd.net/cases/tck/perspectives/introduction.pdf> (NSF-funded research paper accessed Jan. 30, 2014)

- Scale up the number and reach of our CRT stakeholder engagements to meet or exceed the baseline target

FY 2019

- Launch version 3.0 of the CRT and begin Quality of Relationship evaluation and assessment of it, led by external evaluator
- Continue to expand the CRT's "Taking Action" library of case studies
- Continue to expand the CRT's "Tools" compendium, working collaboratively with the agencies of the U.S. Global Change Research Program
- Continue to expand the Climate Explorer's menu of topic-related map layers that help people visualize climate-related stressors, and people and assets that are at risk
- Conduct CRT stakeholder engagements

FY 2020

- Complete (QoR) assessment and evaluation of version 3.0 of the CRT, summarize lessons learned, and recommend any edits or additions to the CRT's scope
- Conduct CRT stakeholder engagement

Deliverables:

Climate Resilience Toolkit:

- A mobile-device-friendly version of the Climate Resilience Toolkit
- An enhanced Climate Explorer that provides access to climate projection data and geo-tagged case studies (adaptation success stories)
- An expanded list (both sectorally and regionally) of case studies
- A Climate Widget (v2.0, details above)
- An expanded catalog of training courses, stitched together into purposeful learning progressions for building skill and capacity, with partners who offer certificates of completion
- An online discussion forum and virtual "help desk" to facilitate knowledge-sharing between climate experts and stakeholders

Climate Literacy Learning Center:

- Learning Center interface design and development
- Cross-walking the Learning Center with Climate.gov's "Teaching Climate" section

Performance Goals and Measurement Data:

A new goal through this new development effort is to show a sustained increase in return visits by 20 percent per year over the previous year to the Maps & Data, Supporting Decisions, and Teaching Climate sections of Climate.gov. This measure will be in addition to and will complement our ongoing Quality of Relationship metric and other success metrics already in place.

Performance Measure: Percentage growth in number of <u>return visits</u> to each section in NOAA Climate.gov over the preceding year's measure.	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	20%	20%	20%	20%	20%
Without Increase	10%	10%	10%	10%	10%	10%	10%
Description: This performance measure aims to show an ongoing increase in the average number of return visits to the Portal's Maps and Data, Supporting Decisions, and Teaching Climate sections. The late FY 2013 deployment of Google Analytics gives NOAA the ability to track return visitors, which allows NOAA to track this measure going forward.							

PROGRAM CHANGE PERSONNEL DETAIL

Budget Program: Office of Oceanic and Atmospheric Research
Sub-program: Climate Research
Program Change: NOAA Climate.gov Portal

Title:	Location	Grade	Number of Positions	Annual Salary	Total Salaries
Decision Support Specialist	Silver Spring, MD	ZP-IV	1	89,924	89,924
Subtotal			<u>1</u>		<u>\$89,924</u>
Less Lapse	25%		<u>0</u>		<u>(\$22,481)</u>
Total Full-time permanent:			1		\$67,443
2016 Pay Adjustment	1.3%				\$877
TOTAL			1		\$68,320
Personnel Data			Number		
Full-time Equivalent Employment					
Full-time permanent			1		
Other than full-time permanent			0		
Total			<u>1</u>		
Authorized Positions:					
Full-time permanent			1		
Other than full-time permanent			0		
Total			<u>1</u>		

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: Office of Oceanic and Atmospheric Research
Sub-program: Climate Research
Program Change: NOAA Climate.gov Portal

Object Class		FY 2016 Increase	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	\$68	\$3,465
11.3	Other than full-time permanent	0	32
11.5	Other personnel compensation	0	20
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	<u>68</u>	<u>3,517</u>
12	Civilian personnel benefits	20	971
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	20	496
22	Transportation of things	0	15
23.1	Rental payments to GSA	0	174
23.2	Rental Payments to others	0	120
23.3	Communications, utilities and miscellaneous charges	0	69
24	Printing and reproduction	0	3
25.1	Advisory and assistance services	0	763
25.2	Other services	2,152	9,022
25.3	Purchases of goods & services from Gov't accounts	0	12,441
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	120
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	20	1,198
31	Equipment	20	161
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	11,355
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	<u>2,300</u>	<u>40,425</u>

Due to financial system limitations, the object class detail for the Program reflects the Regional Climate Data and Information PPA.

Regional Climate Data and Information: Regional Integrated Sciences and Assessments (Base Funding: \$5,872,000 and 2 FTE; Program Change: +\$ 5,852,000 and +1 FTE): NOAA requests an increase of \$ 5,852,000 and 1 FTE for a total of \$11,724,000 and 3 FTE to expand its capability for regional research and information services.

Proposed Actions:

Proposed funding will allow NOAA to increase its support of external research teams who work with resource managers and planners to develop and utilize new information about the impacts of climate on communities, natural and managed resources, infrastructure, transportation, and health through the Regional Integrated Sciences and Assessments (RISA) program

Two new regions would be competitively awarded adding to the current number of 11 regions. These additional regions would include the Mid-Atlantic (e.g. Virginia, Maryland, Delaware, and the District of Columbia) and the Midwest (e.g. Iowa, Missouri, Illinois, Indiana, and Ohio). Priorities for these competitions would be focused on regional issues such as drought, flooding, storm surges, heat waves and longer term issues of sea level rise and climate trends. Partnerships with Federal entities such as U.S. Department of Agriculture (USDA), U.S. Department of the Interior (DOI), U.S. Environmental Protection Agency (EPA), and Federal Emergency Management Agency (FEMA) will be critical as well. Each RISA award would provide research and service capacity to the decision makers and regional, state, and local communities afflicted by climate risks in these regions. For example, a Mid-Atlantic RISA could help coastal communities prepare for and respond to coastal flooding from storms, such as Superstorm Sandy. A Midwest RISA could help farmers cope with the effects of drought and flooding in the Missouri River basin.

Requested funds will also augment and ensure explicit collaborative partnering with NOAA's regional information system components (e.g., NIDIS, NESDIS Regional Climate Service Directors, NOS Coastal Services Centers, NWS Regional offices, NMFS regional offices) as well as other Federal, state, and private providers (e.g. DOI Climate Science Centers, USDA Climate Change Hubs). Such collaborative efforts have already supported a water reservoir visualization tool for water managers and cattle ranchers in the southern U.S. and climate outlook products for emergency managers in California who work with the FEMA.

Statement of Need and Economic Benefits:

Every year, the impacts of climate variability and change on water availability, wildfire regimes, public health, agriculture, energy issues, and coastal communities become more acute while climate sciences are making great strides in producing knowledge that could aid decision makers dealing with these issues.

Crops and livestock alone are valued at \$77 billion for the Midwestern region of the U.S.⁹, and fisheries and tourism amount to over \$5 billion of value for the Chesapeake Bay region¹⁰. With the addition of RISAs, the agriculture, fisheries and tourism sectors, along with cities and communities in the Midwest and Chesapeake Bay regions, will gain valuable scientifically-based information about droughts, floods, storm surges, and temperature changes in these regions. RISA scientists provide information that decision makers use to cope with drought, understand climatic influences on wildfire, and assess climate impacts on the transportation sector, coastal communities, and human health.

⁹ Hatfield, J., 2012: Agriculture in the Midwest. In: *U.S. National Climate Assessment Midwest Technical Input Report*. J. Winkler, J. Andresen, J. Hatfield, D. Bidwell, and D. Brown, coordinators. Available from the Great Lakes Integrated Sciences and Assessments (GLISA) Center, http://glisa.msu.edu/docs/NCA/MTIT_Agriculture.pdf.

¹⁰ *The Economic Importance of the Bay*. Retrieved from <http://www.cbf.org/how-we-save-the-bay/issues/cost-of-clean-water/economic-importance-of-the-bay>.

Stakeholders use such information to evaluate potential climate impacts on water supplies and hydroelectric power, and support disaster management planning. RISAs are helping farmers, ranchers, and fishermen use climate information to produce the Nation's foods and materials and stakeholders from the Midwest and Chesapeake Bay regions are asking for similar help in their regions.

Resource Assessment:

Resources for this activity are described in the Regional Data and Information narrative.

Schedules and Milestones:

FY 2016

- Solicit proposals for new RISAs in the Mid-Atlantic and Midwest
- Solicit proposals to develop research products that will contribute to and deepen partnerships with regional information providers in the existing RISA regions

FY 2017

- Launch new RISAs

FY 2017 - 2018

- Initiate 1-2 new research partnerships between RISA, regional NOAA information providers, and interagency partners (e.g. DOI, USDA)

FY 2019 - 2020

- Initiate 1-2 new research partnerships between RISA, regional NOAA information providers, and interagency partners (e.g. DOI, USDA)

Deliverables:

- Expand applied research support of local, state, and regional decision makers in both the Mid-Atlantic and the Midwest with two new five-year cooperative agreement centers
- Develop or enhance research priorities for regional climate science and services in partnership with the USDA and DOI

Performance Goals and Measurement Data:

Performance Measure:	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
Number of regionally and sectorally focused climate impacts and adaptation studies communicated to decision makers (per year)							
With Increase	N/A	N/A	27	28	29	30	31
Without Increase	27	27	27	27	27	27	27
Description: Number of peer-reviewed publications and reports published and released annually. The publications/reports are developed through interaction with and/or are communicated to stakeholders. Publications and reports are collected from investigators conducting climate impacts and adaptation research in cooperation with stakeholders. The goal of this research is to better understand and enhance the use of NOAA products and information to meet user requirements for natural resource management information in various sectors (e.g. drought and water resources, fire risk, ecosystem and coastal impacts, sea-level rise, human health, agriculture, etc.							

Performance Measure: Number of states or territories using new or tailored climate services (tools, information, technical assistance, or products) as a result of regional, state, and local interaction with decision makers (each year)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	7	9	11	12	14
Without Increase	5	5	7	8	9	10	11
Description: The number of products and services, including provided or existing products and services that are modified/expanded for new user groups or regions. 'Products and services' include technical assistance, training, and guidance documents to enable planning and decision making. (This measure is partially based on the current GPRA: Number of regionally and sectorally focused climate impacts and adaptation studies communicated to decision makers.)							

PROGRAM CHANGE PERSONNEL DETAIL

Program: Office of Oceanic and Atmospheric Research
Sub-program: Climate Research
Program Change: Regional Integrated Sciences and Assessments

Title:	Location	Grade	Number of Positions	Annual Salary	Total Salaries
Physical or Social Scientist	Silver Spring, MD	ZP-IV	1	\$89,924	\$89,924
Subtotal			<u>1</u>		<u>\$89,924</u>
Less Lapse	25%		<u>0</u>		(\$22,481)
Total Full-time permanent:			1		\$67,443
2016 Pay Adjustment	1.3%				\$877
TOTAL			1		\$68,320
Personnel Data			Number		
Full-time Equivalent Employment					
Full-time permanent			1		
Other than full-time permanent			<u>0</u>		
Total			1		
Authorized Positions:					
Full-time permanent			1		
Other than full-time permanent			<u>0</u>		
Total			1		

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: Office of Oceanic and Atmospheric Research
Sub-program: Climate Research
Program Change: Regional Integrated Sciences and Assessments

Object Class		FY 2016 Increase	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	\$68	\$3,465
11.3	Other than full-time permanent	0	12
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	68	3,477
12	Civilian personnel benefits	24	995
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	496
22	Transportation of things	0	15
23.1	Rental payments to GSA	0	174
23.2	Rental Payments to others	0	120
23.3	Communications, utilities and miscellaneous charges	0	69
24	Printing and reproduction	0	3
25.1	Advisory and assistance services	0	763
25.2	Other services	305	7,682
25.3	Purchases of goods & services from Gov't accounts	0	12,949
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	120
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	1,178
31	Equipment	0	141
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	5,455	15,795
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	5,852	43,977

Due to financial system limitations, the object class detail for the Program reflects the Regional Climate Data and Information PPA.

Climate Competitive Research: Impacts of Climate on Fish Stocks (Base Funding: \$2,100,000 and 0 FTE; Program Change: +\$5,504,000 and + 1 FTE): NOAA requests an increase of \$5,504,000 and 1 FTE for a total of \$7,604,000 and 1 FTE to fund research to improve understanding of impacts of climate variability and change on fisheries.

Proposed Actions:

The proposed research investment improves understanding of the impacts of climate variability and change on fish stocks, prey availability, and habitat. Funds will be competitively awarded as grants through the NOAA Oceanic and Atmospheric Research Climate Competitive Research line. Collaboration with NOAA Laboratories, Fisheries Science Centers, Cooperative Institutes, and Sea Grant will be encouraged to enhance the effectiveness of the research and ensure that outcomes inform sustainable fisheries management.

A request for proposals (RFP) will be developed for FY 2016 to build off of already funded research focused on the Northeast. The funding opportunity for this initial research was a collaborative effort between OAR and NOAA Fisheries. This increase will allow NOAA to expand research to other U.S. regions, to address specific information needs related to the application and integration of climate information into fisheries management. A combination of smaller 2-3 year awards and larger 5-year interdisciplinary, multi-institution awards will be supported through the RFP. All proposals will be reviewed through a rigorous panel review process and selected to ensure strong alignment with the request for proposals.

This proposed research investment will lead to the development of valuable information, decision-support tools, and training to build capacity for integrating climate information into fisheries management. Enhancing early-warning and management of the impacts of climate variability and change will help minimize economic disruption for the many communities, citizens, and livelihoods across the Nation that depend on healthy fisheries.

Statement of Need and Economic Benefits:

Healthy and productive fisheries are an essential component of U.S. economies and societies. Americans consume about 5 billion pounds of seafood each year (NMFS 2012)¹¹. In 2009, U.S. marine commercial and recreational fisheries contributed approximately \$167 billion in sales impacts and 1.3 million jobs (NMFS 2010)¹². Sustainable fisheries create and sustain jobs, stabilize economies in coastal working waterfronts, provide opportunities for commerce, and help to meet the growing demand for seafood across the U.S. and the world.

This proposed action addresses a timely and high-priority need for stakeholders, as fisheries managers in the U.S. have recently expressed concern about the impacts of climate variability and change on fish stocks. Climate-related impacts (e.g. extreme events, warmer-than-normal water temperatures) can have significant effects on the abundance, distribution, and productivity of fish stocks. For example, the Northeast has been experiencing groundfish declines, likely in part due to recent changes in ocean conditions. During the first six months of 2012, sea surface temperature in the Northeast Shelf Large Marine Ecosystem were the highest ever recorded, and above-average temperatures were found from the ocean bottom to the surface across the region. The annual spring

¹¹ National Marine Fisheries Service. 2012. Fisheries of the United States, 2011. U.S. Department of Commerce, Current Fisheries Statistics No. 2011.

¹²National Marine Fisheries Service. 2010. Fisheries Economics of the United States, 2009. U.S. Department of Commerce, NOAA Technical Memorandum. NOAA Fisheries-F/SPO-118, 172p.

plankton bloom in the Gulf of Maine was intense, starting earlier and lasting longer than normal, and Atlantic cod continued to shift northeastward in distribution. These changes have consequences for the fisheries and communities that depend on them, leading to economic disruption. This investment in research would provide critical advances in understanding and projection of climate-related impacts to inform sustainable management of the Nation's fisheries. Healthy U.S. fisheries are a critical part of the Department of Commerce (DOC)'s missions in economic growth, science and information, and environmental stewardship. This research topic addresses key information needs for management and stewardship, while advancing and leveraging NOAA's core capabilities in climate and ecosystem science.

Resources Assessment:

This work will build off and leverage existing capabilities advanced through: NOAA's Competitive Climate Research line (e.g. through the Coastal and Ocean Climate Applications program), NOAA's National Marine Fisheries Service (NMFS) (e.g. Fisheries Science Centers, NMFS Office of Science & Technology), Sea Grant, and research underway and in development at NOAA Laboratories and Cooperative Institutes. In addition, this research would provide new opportunities for collaboration across Federal partners, such as the National Aeronautics and Space Administration (NASA) and the Department of the Interior (DOI), that have capabilities and programs in climate and ecosystem science.

Schedule and Milestones:

FY 2016 – 2018

- Support the implementation of 3-year projects to address the impacts of climate on fish, their prey, and habitat

FY 2016 – 2020

- Support the implementation of 5-year projects to build understanding, institutional capacity, and management of the impacts of climate variability and change on fish, their prey, and habitat

Deliverables:

This research will support external researchers, in partnership with NOAA entities (e.g. Fisheries Science Centers, Laboratories, Cooperative Institutes), to advance understanding of and planning for climate impacts on fish and fisheries. Deliverables will include:

- Understanding and assessment of the needs of marine resource managers and constituencies for climate products and services to inform the development of research and services
- Integration, synthesis, and analysis of existing climate and ecological (e.g. fish abundance, distribution) observational and monitoring data
- Development and advancement of coupled climate-ocean-ecosystem models to foster understanding and projection of climate impacts on fish stocks
- Innovative research to determine the impacts of extreme events, climate variability, and climate change on fish, their prey, and habitat
- New, interdisciplinary partnerships (between physical, ecological, social, and economic scientists) and partnerships between scientists and decision makers
- Climate vulnerability assessments for commercially and recreationally important fish species
- State-of-the-art, user-friendly, science-based tools (including trainings, guidebooks, websites, etc) to support ongoing decision-making to prepare for, manage, and respond to climate risks on fish and fisheries
- Marine resource managers effectively integrating climate information into fisheries stock assessments, management plans, and practices
- Enhanced public awareness of climate risks and impacts to fish, their prey, and habitats

Performance Goals and Measurement Data:

Performance Measure: Number of marine resource managers in Federal (NMFS), state (state agencies) and tribal government agencies integrating climate data and information to improve decision-making in the face of a changing climate.	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	15	30	90	150	210
Without Increase	0	0	15	30	30	60	90

Description: Number of marine resource managers who have access to and use climate information to inform fisheries stock assessments, management plans, and practices. This includes participation in capacity-building and training activities.

Performance Measure: Number of regional-scale projections and assessments to inform fisheries planning and management.	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	1	1	3	5	7
Without Increase	0	0	1	1	1.5	3	5

Description: Regional-scale projections and assessments will contribute to improved understanding of current and future climate (e.g. changes in temperature, pH) and ecosystem (e.g. changes in prey availability, habitat) conditions and associated consequences for marine fisheries. Knowledge gained through these efforts will inform planning and management.

Performance Measure: Cumulative number of science-based adaptation tools and technologies that are used by NOAA partners and stakeholders to improve ecosystem-based management of fisheries.	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target	FY 2021 Target
With Increase	0	0	3	7	10	15	25
Without Increase	0	0	3	3	7	10	15

Description: This measure tracks success in translating research findings into adaptation tools and technologies used by fisheries management community. The use of these products will improve sustainable management to enhance ecological and economic resilience in the face of change.

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: Office of Oceanic and Atmospheric Research
Sub-program: Climate Research
Program Change: Impacts of Climate on Fish Stocks

Title:	Location	Grade	Number of Positions	Annual Salary	Total Salaries
Physical or Social Scientist	Silver Spring, MD	ZP-IV	1	\$89,924	\$89,924
Subtotal			<u>1</u>		<u>\$89,924</u>
Less Lapse	25%		<u>0</u>		<u>(\$22,481)</u>
Total Full-time permanent:			1		\$67,443
2016 Pay Adjustment	1.3%				\$877
TOTAL			1		\$68,320
Personnel Data			Number		
Full-time Equivalent Employment					
Full-time permanent			1		
Other than full-time permanent			<u>0</u>		
Total			1		
Authorized Positions:					
Full-time permanent			1		
Other than full-time permanent			<u>0</u>		
Total			1		

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: Office of Oceanic and Atmospheric Research
Sub-program: Climate Research
Program Change: Impacts of Climate on Fish Stocks

Object Class		FY 2016 Increase	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	\$68	\$9,000
11.3	Other than full-time permanent	0	677
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	68	2,895
12	Civilian personnel benefits	24	5747
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	10	937
22	Transportation of things	0	307
23.1	Rental payments to GSA	0	1031
23.2	Rental Payments to others	0	232
23.3	Communications, utilities and miscellaneous charges	0	69
24	Printing and reproduction	0	3
25.1	Advisory and assistance services	0	763
25.2	Other services	-	2,928
25.3	Purchases of goods & services from Gov't accounts	0	4,094
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	120
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	10	1,178
31	Equipment	0	141
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	5,392	45,385
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	5,504	65,830

Due to financial system limitations, the object class detail for the Program reflects the Climate Competitive Research PPA.

APPROPRIATION ACCOUNT: OPERATIONS, RESEARCH, AND FACILITIES

SUB-PROGRAM: WEATHER AND AIR CHEMISTRY RESEARCH

The objectives of the Weather and Air Chemistry Research sub-program support

- research and development that provides the Nation with accurate and timely warnings and forecasts of high-impact weather events and their broader impact on issues of societal concern such as weather and air quality; and
- research that provides the scientific basis for informed management decisions about weather, water, and air quality.

Researchers at OAR Laboratories and Cooperative Institutes have been key contributors to the advancement of the National Weather Service (NWS) by providing the research to better understand severe weather events and through technological advancements in weather modeling, computing and observing. OAR scientists strive to continually improve NOAA's capabilities as well as other Federal agencies' capabilities to provide more accurate and timely warnings and forecasts of various high-impact weather, water, and air quality events. Examples of these high-impact events includes, floods, droughts, heat waves, severe storms, hurricanes, tsunamis, smoke, volcanic ash, and dust plumes, and the deposition of nutrients, heavy metals, and toxic organic substances to the surface of the earth. More information on this sub-program is available at www.research.noaa.gov/weather.

LABORATORIES AND COOPERATIVE INSTITUTES

Atlantic Oceanographic and Meteorological Laboratory (AOML)

AOML research encompasses ocean, coastal, and climate studies to ready the Nation for changes driven by weather, climate, and pressures on marine ecosystems. Its focus includes improving the prediction of hurricane track and intensity; the ocean's role in climate and extreme weather events, such as rainfall and hurricanes; the global impacts of increased ocean acidification; and human impacts on coastal ecosystems, such as increased nutrients and microbial contamination. AOML leads many international efforts to collect and interpret global observations collected from ships, satellites, aircraft, drifting buoys, and floats.

National Severe Storms Laboratory (NSSL)

NSSL seeks to improve the accuracy and timeliness of forecasts and warnings of hazardous weather events such as thunderstorms, tornadoes, flash floods, lightning, and winter weather. NSSL develops techniques, computer models, and applications to help forecasters improve the accuracy and increase the amount of lead-time for NWS forecasts and warnings. NSSL's radar, forecast and warning, and hydrometeorology research helps our Federal, university, and private sector partners work toward a Weather-Ready Nation.

Physical Sciences Division (PSD)/ESRL

PSD provides NOAA with the essential core capability to conduct water cycle and weather physics research across time and space scales with an emphasis on extreme events in the Earth system that lead to floods, droughts, and heat waves.

Air Resources Laboratory (ARL)

ARL improves the characterization and prediction of plumes resulting from the accidental or intentional release and dispersion of airborne hazardous materials. ARL also conducts short- and long-term air-surface exchange studies and develops numerical models to address a wide range of critical atmospheric chemistry and deposition issues. ARL's research provides tools, data, and

products that are essential to air quality decision makers, air quality forecasters, emergency managers, and the research community.

Chemical Sciences Division (CSD)/ESRL

CSD conducts research to understand and quantify the chemical emissions of gaseous and particle (aerosol) pollutants, their precursors, and the processes responsible for their transport and transformation in the atmosphere. This contributes to better understanding of the impacts of pollutants on U.S. air quality and climate.

Global Monitoring Division (GMD)/ESRL

GMD conducts long term observations by balloon-borne, cryogenic frost point hygrometers launched from Boulder, Colorado; Hilo, Hawaii; and Lauder, New Zealand to obtain vertical profiles of water vapor in the upper troposphere and lower stratosphere (to ~30 km).

Global Systems Division (GSD)/ESRL

GSD develops next-generation weather models, advances new technologies to run the models, and enhances the forecast information for better decision making. GSD's global modeling capability is designed to provide an improved research tool for dynamical-chemical-hydrological-ocean-land-surface interactions. GSD also investigates, develops, and applies advanced technologies to optimize the computing of models, to provide faster and more comprehensive weather information to decision makers, to assess the forecast impact of meteorological observations, and to educate about Earth system science using Science On a Sphere.

Geophysical Fluid Dynamics Laboratory (GFDL)

As part of its weather research activities, modeling activities centered at GFDL focus on long lead-time research to understand the predictability of weather on both large and small scales and to translate this understanding into improved numerical weather prediction models. These activities improve understanding of atmospheric circulations ranging in scale from general circulation to hurricanes, with an emphasis on extreme weather events. These activities also focus on the interplay between weather phenomena and climate variability and change, using high resolution atmospheric modeling as the central tool.

Office of Weather and Air Quality (OWAQ)

OWAQ leads NOAA's participation in the multi-agency Earth System Prediction Capability (ESPC) project and coordinates ESPC research activities conducted by OAR's laboratories, cooperative institutes, and other Federal agencies to develop a national numerical modeling capability to predict hazards, which will allow for public warning of high-impact environmental events as well as the ability to contribute important environmental information for resource and infrastructure planning prior to and during these events.

Pacific Marine Environmental Laboratory (PMEL)

OWAQ helps improve weather forecast information and products for the Nation by supporting high-impact weather and air quality research that ultimately leads to improvements to NOAA's operational forecasts that help save lives and reduce property damage. OWAQ supports research conducted by NOAA scientists and partners that focus on high-impact weather and air quality research, including hurricanes, severe thunderstorms, heavy precipitation, air quality, and the social science associated with how the Public processes this information and reacts. OWAQ manages NOAA's U.S. Weather Research Program (USWRP) and leads NOAA's participation in the multi-agency Earth System Prediction Capability (ESPC) project, a project to develop a national numerical modeling capability to predict high-impact environmental events.

Unmanned Aircraft Systems (UAS) Program

OAR's UAS program is an initiative that accelerates the research, development, and transition of innovative new observational platforms and forecast tools to advance NOAA's Earth-system product, service, and information enterprise. The program works with academia to develop and test a UAS observing strategy for regional river flood monitoring suitable to address the real-time observing needs of the National Weather Service. This observing strategy will be expanded in 2016 to include localized severe storms and tornadoes. The UAS program is also working with NASA to expand the Global Hawk partnership to NOAA-dedicated Global Hawk missions using NASA-funded Hurricane Severe Storm Sentinel (HS3) payload sensors, facilities, and science team and aviation personnel. These missions will be used to evaluate the impact of UAS observations on improving real-time weather forecasting and the feasibility of UAS observations to mitigate the degradation of weather forecasting services in the event of satellite observing gaps.

Wind Boundary Layer Research Program

NOAA is improving physical characterization of winds in the boundary layer in its foundational weather models by deploying wind testbeds in different regions of the nation that are meteorologically distinct (i.e., have different factors affecting the weather) using, remote sensing instruments, such as wind profiling radars, sodars, lidars, and radiometers, standard in-situ anemometers on industry-provided tall towers.

Schedule and Milestones:

FY 2016 – 2020

- Ingest and assimilate additional observations, e.g., from wind farms, to improve weather forecast model output
- Assess of the feasibility of operational use of gap filling radars to augment legacy observing systems (e.g. NEXRAD) in the west to provide better precipitation and water supply information
- Integrate advances in process understanding from field experiments (Hydrometeorology Testbed & CalWater2) that have focused on extreme precipitation events and their role in the water cycle to improve the skill and reliability of flood and water supply forecasts

FY 2016

- Develop more quantitative volcanic ash predictions to anticipate future aviation requirements by developing more detailed emission algorithms linked with assimilation of satellite observations of volcanic ash plumes
- Complete regional field studies of ammonia exchange between the air and agricultural land
- Continue tests of various approaches to demonstrate a probabilistic hazard grid warning system using model assimilation analyses as a prototype for WoF
- Continue to maintain and develop research radar systems (NO-XP, KOUN, mobile radars) to support scientific inquiry
- Transfer to operations the advanced multi-sensor dual polarization radar QPE techniques for warm season and begin development of advanced MRMS dual polarization radar QPE for cool season using ground radar, rain gauges, and atmospheric environmental data
- Coordinate and conduct yearly Intensity Forecast Experiment in partnership with NWS, NESDIS, and AOC to improve hurricane track and intensity forecasts
- Continue tests of ensemble Kalman filter data assimilation system for possible implementation in NOAA's operational HWRF

- Test impact of assimilation of satellite microwave radiance data using OSSE and OSE approaches
- Develop and test advanced physics packages for possible implementation into HWRF to enable simulations at resolutions down to 1 km
- High-quality hurricane observations from airborne experiments for use in hurricane regional model data assimilation and evaluation, in particular dropsondes, Doppler radar, *in situ*, and stepped frequency microwave radiometer (FY 2016 – 2017)
- Conduct field missions and prepare analysis of UAS observations for improved forecasting of river floods, localized severe storms and high impact storms at sea
- Deploy and operate testbed in meteorologically distinct regions of the Nation
- Implement ESPC-proposed model improvements and evaluate impact on predictions of case studies and current high-impact weather events
- Conduct laboratory study to advance understanding of climate-air chemistry-health interconnections related to biomass burning emissions
- Provide scientific synthesis report from previous intensive field study in the U.S. (Shale Oil and Natural Gas Nexus – SONGNEX)
- Integrate long-term records to understand changes in the distributions and trends of atmospheric gases affecting climate, ozone depletion, and atmospheric composition (FY 2016 - 2017)
- Test one component in the Hazardous Weather Testbed. (FY 2016 - 2018)

FY 2017

- Develop North American Rapid Refresh Ensemble
- Conduct further mercury model development to reduce uncertainties found from model-data comparison.
- Evaluate accuracy and lead-time improvements through the use of inputs from quantitative precipitation forecasts into a prototype flash-flood prediction system.
- Begin integration of space-borne radar data from Global Precipitation Mission into the MRMS system to improve QPE accuracy for the U.S. mountainous west
- Continue development of the space-borne and ground radar merged QPE in the MRMS system
- Conduct laboratory evaluation of ozone-depletion potential, greenhouse-warming potential, and atmospheric degradation products of an industry-proposed replacement compound
- Validate and improve emission inventory for species important for climate and air chemistry using data from previous intensive field study
- Prepare final observation impact, cost benefit and operational effectiveness analysis to inform NOAA Go/No Go of UAS acquisition for improved weather forecasting
- Refine microphysical parameterizations of the NWP models using polarimetric radar data and results of polarimetric microphysical retrievals

FY 2018

- Complete a regional mercury assessment for a sensitive ecosystem in the vicinity of one or more of the Atmospheric Mercury Network sites (e.g., Gulf of Mexico)
- Expand the number of stations feeding observations data to the Meteorological Assimilation Data Ingest System (MADIS) to 100,000
- Implement probabilistic products in flash flood forecasting system
- Begin integration of satellite data from Global Precipitation Measurement Mission and GOES-R into the MRMS system to improve QPE accuracy for the U.S. mountainous west

- Transfer to operations the advanced multi-sensor dual-polarization radar QPE techniques for cool season precipitation. Deploy and operate testbed in meteorologically distinct regions of the Nation. Each testbed would remain in operation for one year
- Assess the advanced nesting capability of the HWRF model coupled with an ocean/wave model
- Begin transition of UAS from research to operations
- Conduct FIREX field mission in western U.S.

FY 2019

- Develop a multi-scale emergency response model covering scales from the local to global using both Lagrangian and Eulerian modeling approaches
- Evaluate the HRRR Ensemble model and data assimilation system in preparation for NextGen mid-operational capability
- New testing in the Hazardous Weather Testbed will combine forecasters, radar, and model output for experimental warnings
- Validate and improve emission inventory for species important for climate and air chemistry using data from previous intensive field study
- Conduct laboratory evaluation of ozone-depletion potential, greenhouse-warming potential, and atmospheric degradation products of an industry-proposed replacement compound
- Continue tests of ensemble Kalman filter data assimilation system for possible implementation in NOAA's operational HWRF. Test impact of assimilation of satellite microwave radiance data using OSSE and OSE approaches
- Implement and test a real-time version of WoF system in research mode
- Evaluation and refinements of the real-time MRMS dual polarization radar QPE performance from different seasons and different geographical regions (FY 2019 - 2020)

FY 2020 and Beyond

- Complete a regional mercury assessment for a sensitive ecosystem in the vicinity of one or more of the Atmospheric Mercury Network sites (e.g., Chesapeake Bay)
- Conduct intensive field study to advance understanding of climate-air chemistry-health interconnections - region TBD
- Continue development and testing of new instrumentation, including potential observing systems for an unmanned aircraft systems and satellite sensors that are coming online as part of JPSS and GOES-R
- Development of the next generation hurricane observing system using OSSE and OSEs to meet NOAA's needs for model evaluation and initialization (using manned and unmanned aircraft and satellites)
- Test and evaluate the global tropical cyclone forecast system
- Conduct real-time tests of WoF system in Hazardous Weather Testbed in collaboration with NWS forecasters and collect data needed to verify WoF predictions
- Transfer to operations the MRMS space-borne and ground radar merged QPE

Performance Goals and Measurement Data:

Hurricane Research

Performance Measure: Reduce uncertainty of hurricane processes that drive track and intensity change based on high-quality observations from airborne experiments (cumulative)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	9%	11%	13%	15%	17%	19%	19%

Description: Data collected in and about the hurricane environment from hurricane hunter flights during the annual field program is invaluable to increasing knowledge of how hurricanes develop, move, and intensify. As a result of research and publications based on these observations, there will be increased knowledge that will be incorporated by the hurricane modeling community, resulting in increased accuracy in hurricane models. This observation program serves as the foundation for meeting NOAA's weather-ready nation goal of reducing forecast uncertainty and unnecessary evacuations that result in economic impacts to communities.

Performance Measure: Increase cumulative percent reduction in error of track and intensity guidance of the HWRF model system	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	27%	32%	37%	42%	47%	52%	57%

Description: As a result of new hurricane observing systems, improved nesting capability, and advanced physics packages applicable at 1-km horizontal resolution, hurricane track and intensity forecasts using regional HWRF model system will see a reduction in forecast error. Incorporating this improved hurricane data directly addresses NOAA's weather-ready nation goal of reducing forecast uncertainty and unnecessary evacuations that result in economic impacts to communities.

Severe Storms Research

Performance Measure: Expand cumulative number of severe weather events for which Warn-on-Forecast numerical predictions of tornado lead time exceeds 20 minutes	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	2	4	6	7	8	9	10

Description: The Warn-on-Forecast program is working to combine high resolution models with high resolution data (from radars and other observations), advanced data assimilation and quality control techniques, and high-end computing to produce a forecast of a tornado that would effectively extend tornado warning lead times well beyond the current national average of 13 minutes. This NWS GPRA goal shows the amount of warning the public is given for tornadoes (national average, in minutes) by NWS. NSSL conducts research that leads to improved warning skill scores (higher probability of detection, increased lead times, and reduced false alarms) through the Hazardous Weather Testbed experiments.

Performance Measure: Improve cumulative number of years completed in historical re-analysis of CONUS WSR-88D data	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	14	18	20	21	22	23	2
Description: This performance measure shows the cumulative number of years of the CONUS WSR-88D network that have been processed and analyzed with the MRMS system (WRDD). The re-analysis of WSR-88D data will provide storm statistics (probabilistic guidance) that can be used to better inform the public. The probabilistic guidance available from the re-analysis will also set the baseline performance measure for evaluation of Warn-on-Forecast guidance products. Archive begins in 1996.							

Performance Measure: Continue improvement of flash flood warning skill scores of a prototype national flash flood guidance tool	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	0.22	0.25	0.27	0.29	0.31	0.33	0.35
Description: This performance measure shows the improvement of the Critical Success Index (CSI) skill score (higher CSI scores show a combined higher probability of detection and reduced number of false alarms) of the prototype flash flood guidance tool compared to the operational flash flood guidance during a demonstration and evaluation in the Hazardous Weather Testbed. Improved flash flood guidance will result in more precise and timely Flash Flood warnings and benefit the public.							

Air Chemistry Research

Performance Measure: Increase cumulative number of regional assessments of atmospheric mercury source-receptor relationships	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	2	2	3	3	4	4	5
Description: This provides key information for air quality and environmental policy-makers and managers and for negotiators for international agreements—enabling them to make informed decisions concerning the control of mercury emissions.							

Performance Measure: Expand cumulative number of dispersion and air quality prediction system updates made available to NWS	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	5	6	7	8	9	10	11
Description: The updates of dispersion and air quality modeling systems, made available to NWS for operational use, will contribute to improved outcomes by improving the accuracy and usefulness of NWS dispersion and air quality prediction products. The updates also improve the ease of use and flexibility of the software for meeting NWS needs. NWS uses these modeling systems, such as HYSPLIT, for dispersion and air quality predictions for applications ranging from local chemical releases to international radiological incidents to smoke predictions, providing information to customers ranging from local emergency managers to the World Meteorological Organization to state air quality agencies.							

Weather Models and Advanced Technologies

Performance Measure: Increase cumulative percentage improvement in accuracy (probability of detection of ceiling <1000 ft.) of the 3-hour cloud ceiling for aviation forecasts	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	6%	7%	8%	9%	10%	10%	10%
Description: Better awareness of expected cloud ceiling over the next 3-hour period is critical to airline safety and aircraft take-offs and landings. Cumulative percentage improvements (approx. 1% per year) will be derived from operational implementation of a new short-range, rapidly updated model called the Rapid Refresh at NWS/National Centers for Environmental Prediction and continuous updates.							

Performance Measure: Expand cumulative number of major tests and evaluations of numerical weather prediction forecast system component improvements for transitioning to operational numerical weather prediction systems	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	21	26	31	36	41	46	50
Description: The multi-agency Developmental Testbed Center conducts major tests and evaluations of improvements to NWP forecast system components provided by the Numerical Weather Prediction research and operational communities. These tests and evaluations are critical for selecting proposed changes that need to be transitioned to operational centers.							

Unmanned Aircraft Systems

Performance Measure: Percentage of numerical weather forecast improvement attributed to Global Hawk observations in a research setting	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	3%	10%	10%	10%	10%	10%	10%
Description: This work will test the hypothesis that a high altitude, long range, and long endurance UAS will provide unique high spatial and temporal resolution information capable of improving weather prediction skill by 10% or more for high impact weather events.							

Wind Boundary Layer Research

Performance Measure: Grow number of Wind Testbeds Established (yearly). Each testbed would remain in operation for one year	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	0	0	1	0	1	0	1
Description: Deploying a testbed refers to the installation of meteorological equipment, such as wind profiling radars, lidars, and sodars, which collect meteorological observations for use in weather models to provide better weather forecasts. Observations are also used to determine forecast quality and understand forecasting error for later improvements.							

Performance Measure: Increase cumulative improvement in accuracy of forecasted wind speed and direction and accuracy of forecasted timing, amplitude, and duration of wind-ramp events (in testbed regions)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	0%	3%	4%	5%	6%	7%	8%
Description: The skill of a forecast is measured by the error, most often by the root mean square error (RMSE). The RMSE is a standard term in statistics that measures the differences between values predicted by a model and the values actually observed.							

WEATHER & AIR CHEMISTRY RESEARCH PROGRAMS

Research Programs encourage cooperation with external experts in critical fields of research. NOAA’s external partners include Federal, state, and local government entities, universities, and industry. Currently two primary research programs are supported under this line.

U.S. Weather Research Program (USWRP)

Through its U.S. Weather Research Program (USWRP), NOAA seeks to improve weather and air chemistry forecast and warning information and products by funding, finding, and facilitating cutting-edge research to improve high-impact weather and air chemistry predictions and warnings to protect lives and property of the American public and inform weather sensitive U.S. industries. USWRP collaborates closely with NOAA scientists and academic partners to transition this research into useful applications that help forecasters provide more accurate and reliable weather forecasts and warnings. The USWRP also supports societal impact studies in weather and a set of related program projects to provide outreach and coordination among NOAA, other government agencies, academia, and industry. USWRP project activities include weather testbeds, environmental modeling research, weather research partnership projects, and socioeconomic research.

Tornado Severe Storm Research/Phased Array Radar

NOAA develops new technologies for detecting and forecasting severe and hazardous weather, including thunderstorms, tornadoes, flash floods, lightning, and winter storms, and for disseminating this information to emergency managers, the media, and the general public for appropriate action. Multi-function Phased-Array Radar (MPAR) has the potential to significantly extend lead times for detecting tornadoes and other forms of severe and hazardous weather. Electronically steered beams and faster scan rates can reduce the time it takes to make a complete Doppler radar observation from 4.5 minutes to less than one minute. Coupled with artificial-intelligence-based decision-support systems, tornado lead times could be increased from the current 13 minutes to over 20 minutes. Additionally, with Improvements and development of new forecast and warning techniques and applications (such as warn-on-forecast) tornado warning lead times could be increased even more. By 2020, more than 350 Federal Aviation Administration (FAA) radars and by 2025 nearly 150 weather radars will either need to be replaced or have their service life extended. If MPAR is successful and implemented as a replacement radar, estimated multi-agency savings could total \$4.8 billion in acquisition costs (\$1.8 billion if replacing all existing radars with similar technology) and life cycle cost savings over 30 years (\$3.0 billion due to fewer radars) (Federal Research and Development Needs and Priorities for Phased Array Radar FCM-R25-2006).

The MPAR program is jointly funded by NOAA and the FAA, and both agencies are coordinating their budget requests. Both FAA and NOAA provided additional funding in FY 2014 to support the MPAR Risk Reduction activities. The additional funding is being used to develop an MPAR Advanced Technology Demonstrator as called for in the MPAR R&D plan. This Advanced Technology Demonstrator will bring the dual polarization technology and multi-function capability into an operating radar system to demonstrate the full capabilities of an MPAR system before the Final Investment Decision (the Go / No-Go decision in FY 2018).

Schedule and Milestones:

FY 2016 - 2020

- Complete annual competitive grant process to select USWRP-funded and demonstration projects
- Evaluate readiness of USWRP-supported research to be transitioned into operations
- Conduct semi-annual reviews of OWAQ-funded projects

FY 2016

- Complete research with social scientist on the Phased-array Radar Innovative Sensing Experiment in the NOAA Hazardous Weather Testbed
- Complete submission of findings for publication in refereed journal
- Complete observational case studies of tornadic storms to investigate the importance of sampling time on understanding storm evolution to be submitted for publication
- Begin field testing selected ground-based observation platforms
- Test radar control and signal processing software
- Fully populate R&D project database and management system with OAR transition projects

FY 2017

- Simulation of full array using computer-based models
- Complete MPAR investment analysis for FAA's Final Investment Decision
- Begin assimilation of observing system data into numerical models and analyze effect on model predictions and determine feasibility of operational implementation along with future operational requirements
- Demonstration of MPAR Advanced Technology Demonstrator and multi-function software

FY 2018

- Prepare recommendation for NOAA's participation in FAA's Final Investment Decision
- Begin development of MPAR production system in coordination with FAA (first article for eventual evaluation and testing)
- Use test results from MPAR prototype to inform Go/No Go decision
- Begin data collection using the MPAR Advanced Technology Demonstrator
- Identify candidate ground-based observation platforms to study

FY 2019

- Participate in MPAR acquisition program with FAA
- Complete observational case studies of tornadic and other severe storms to investigate importance of sampling time on understanding evolution of dual polarization signatures to be submitted for publication

FY 2020

- Preliminary design review of MPAR production

Deliverables:

- Prototype products available for transfer into NOAA operations

- Computer code for improved numerical weather models
- Test/evaluation of dual-polarization panel characteristics and performance
- Contract out design and fabrication of dual-polarized PAR sub-array antenna with FAA
- Test/evaluation of dual-polarization sub-array antenna characteristics and performance
- Publication in FY 2016 of research results demonstrating improved tornado warning decision performance produced in collaboration with NWS forecasters within the NOAA hazardous weather testbed (HWT)
- Studies completed to assess MPAR dual-polarized antenna array configurations for both weather (NOAA weather and FAA airport terminal weather mission) and air surveillance operations (FAA mission)
- Transition of critical technologies, model improvements, and service applications to NOAA’s operational entities

Performance Goals and Measurement Data:

Tornado/Severe Storm Research (Multi-Function Phased-Array Radar (MPAR))

Performance Measure: Increase number of major milestones completed to support NOAA and FAA decision point. (cumulative)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	11	15	18	21	25	27	28
Description: Cumulative number of successfully completed major milestones within Phased Array Radar Risk Reduction Activity such that NOAA and FAA have the information needed to make a Go/No-Go decision on whether to replace existing radar systems with MPAR.							

Performance Measure: Increase cumulative number of events demonstrating improved tornado warning decision performance	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	4	5	6	7	8	9	10
Description: Cumulative number of events demonstrating improved tornado warning decision performance (e.g. longer lead-times, fewer missed events, fewer false alarms, etc.) using the NWRT Phased Array Radar data compared to the WSR-88D-like data in matched studies within the Hazardous Weather Testbed. Note: Research using the NWRT will be phased out beginning in FY18 and a new Performance Measure based on the MPAR “Advanced Technology Demonstrator” will replace it (NWRT will be replaced with a prototype using the latest technology).							

U.S. Weather Research Program (USWRP)

Performance Measure: Maintain research results that are transferred into operations through Testbed Evaluations (per/year)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	1	10	10	10	10	10	10
Description: Evaluation of new scientific findings or development of forecaster tools for potential use in operations that will lead to improved weather forecasts and warnings. The evaluation of research that is targeted for transfer into operations also is informed by the socioeconomic research that is funded within USWRP. Annually, university and Federal scientists receive competitive funding to conduct research that will improve forecasts and warnings of high-impact weather, including tornados and hurricanes. In collaboration with NOAA scientists, the knowledge and tools obtained from these studies are tested and transitioned into NOAA forecast operations.							

Performance Measure: Expand number of observing platforms evaluated in a year.	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	1	1	2	2	3	3	3
Description: The number of observing systems evaluated each year for their ability to improve the detection and/or prediction of severe weather.							

Performance Measure: Percent of projects that demonstrate increased technical readiness.	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	N/A	N/A	30%	50%	70%	70%	70%
Description: This measure tracks the proportion of transition projects that have increased the maturity of a technology by at least one degree of technical readiness (e.g., from TRL 4 to 5) over the course of a year. The total number of transition projects is the number of current projects at TRL 4 and above.							

Performance Measure: Increased percentage of transition projects that are tested and demonstrated in an operational environment.	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	N/A	N/A	10%	20%	30%	30%	30%
Description: This measure tracks the proportion of transition projects that achieve TRL 8 over the course of the year. This marks the end of the demonstration phase and projects are “mission qualified” as defined by TRLs. At this point, systems are ready for deployment (TRL 9), though they may not have yet been adopted by operations. The total number of transition projects is the number of current projects at TRL 4 and above.							

Performance Measure:	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
Percentage of transition projects with signed Transition Plans	N/A	N/A	25%	50%	75%	100%	100%

Description: Transition plans are documents identifying the comprehensive activities necessary to transfer a R&D output to application. The total number of transition projects is the number of current projects at TRL 4 and above.

PROGRAM CHANGES FY 2016:

Weather and Air Chemistry Laboratories and Cooperative Institutes: Vortex-Southeast (Base Funding: \$5,542,000 and 0 FTE; Program Change: -\$5,542,000): NOAA requests a decrease of \$5,542,000 and 0 FTE for a total of \$0 and 0 FTE.

Proposed Actions:

NOAA is using congressionally directed funding as indicated in the Consolidated and Further Continuing Appropriations Act of FY 2015 to initiate this project to understand how environmental factors that are characteristic of the southeastern United States affect the formation, intensity, and storm path of tornadoes for this region. In FY 2016, NOAA proposes to eliminate this project to fully fund other priority programs.

Resource Assessment:

In FY 2015, NOAA laboratories are working in partnership with the National Weather Service, the National Science Foundation, and various academic partners, using the \$5,451,000, to observe key factors driving tornadoes in the Southeastern United States.

Performance Goals and Measurement Data:

Performance Measure: Number of studies completed annually in the South East to improve tornado forecasts.	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With decrease	N/A	N/A	0	0	0	0	0
Without decrease	N/A	3	10	10	10	10	10

Description: Funding goes to a consortium of universities and state agencies in the South East that are coordinated through National Severe Storms Laboratory and Oklahoma University. The consortium enables the universities to collaborate and exploit existing expertise within the academic and state agencies. Field studies will be used to improve tornado forecasts and help meteorologists disseminate information more effectively to the public.

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: Office of Oceanic and Atmospheric Research
Sub-program: Weather and Air Chemistry Research
Program Change: Vortex-Southeast

Object Class		FY 2016 Increase	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent		\$30,027
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	82
11.9	Total personnel compensation	<u>0</u>	30,109
12	Civilian personnel benefits	0	8207
13	Benefits for former personnel	0	407
21	Travel and transportation of persons	(215)	1009
22	Transportation of things	(100)	212
23.1	Rental payments to GSA	0	1342
23.2	Rental Payments to others	0	4235
23.3	Communications, utilities and miscellaneous charges	0	983
24	Printing and reproduction	0	294
25.1	Advisory and assistance services	0	1165
25.2	Other services	0	0
25.3	Purchases of goods & services from Gov't accounts	0	0
25.4	Operation and maintenance of facilities	0	203
25.5	Research and development contracts	(500)	1,401
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	1,496
31	Equipment	(1,400)	3,212
32	Lands and structures	0	3
33	Investments and loans	0	0
41	Grants, subsidies and contributions	(3,327)	12,266
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	<u>(5,542)</u>	66,544

Weather and Air Chemistry Laboratories and Cooperative Institutes: Warn-on-Forecast (Base Funding: \$2,600,000 and 2 FTE; Program Change: +\$1,730,000 and + 2 FTE): NOAA requests an increase of \$1,730,000 and 2 FTE for a total of \$4,330,000 and 4 FTE to accelerate operational implementation of forecasting capabilities which will improve the accuracy of warnings, extend lead times, and enhance decision support services for high impact weather critical for building a Weather-Ready Nation (WRN).

Proposed Actions:

The requested funding will accelerate the research, development, and transition into operations of a prototype Warn-on-Forecast (WoF) modeling system for high-impact weather. This will be achieved through: (1) enhanced Research and Development (R&D) computing capacity; (2) evaluation of research advancements in storm scale modeling systems; and (3) testing and evaluation for operational implementation.

The public is looking to NOAA to provide more precise and longer lead-times for tornado, flash floods, and other high-impact weather warnings. The WoF project began in FY 2010 and is an OAR-led research effort that includes participation from the National Weather Service (NWS) Storm Prediction Center (SPC) and Weather Forecast Office (WFO) in Norman, Oklahoma. Preliminary results with WoF have demonstrated storm scale models simulating past tornadic storms are able to generate realistic development and movement of storms, a critical advancement towards the ability to predict these storms far beyond NOAA's current capability. Once ready for transition to NWS operations, the proposed system will dramatically improve the information provided to decision makers at the local, state, and national level in the following ways:

- Extend tornado warning lead-times well beyond the current average of 13 minutes;
- Provide more geographically precise high impact weather information (e.g., projected tornado paths, or severe wind and hail swaths);
- Provide more precise time of arrival and latest time of departure for storms threatening any given geographic location;
- Generate detailed precipitation forecasts for very fine space and time scales to predict flash flood events well over an hour in advance; and
- Predict the weather on short time scales, with such accuracy, and in such detail that applications would translate into homeland security, hydrometeorology, and fire weather.

Investment in WoF will allow NOAA to develop better warning guidance and tools for NWS forecasters to evaluate and test, especially a real-time, high resolution weather-adaptive numerical weather prediction model which is critical to extending warning lead-times within the next decade. Without WoF capability, the NWS may not be able to extend average tornado warning lead times beyond the current NOAA target of 13 minutes. Without the increase, numerical weather prediction improvements and transition into NWS operations will be delayed by 2-3 years.

Statement of Need and Economic Benefits:

Impacts from severe storms in the U.S. cost hundreds of millions of dollars (Hurricane Sandy and major tornado events such as Joplin, Missouri and Moore, Oklahoma cost billions) and claim 150 to 250 lives per year.¹³ On average, tornadoes kill more than 50 people per year, but in recent years, tornado casualties have increased tenfold (notably during the Alabama outbreak in April 2011). Current warnings for severe weather hazards use techniques that rely on event detection (i.e., using radar and/or public siting). Detection-based methods have essentially reached their potential warning

¹³ <http://www.nws.noaa.gov/om/hazstats.shtml>

lead-time limit. For example, it is becoming increasingly difficult to extend tornado warning lead-times beyond 13 minutes, and in fact, the national mean warning time has not progressed notably since 2003. Together, a successful WoF modeling system and Multifunction Phased Array Radar (MPAR) system could extend warning lead-times up to 60 minutes for tornadoes. Significant extension of warning lead-time for tornadoes and other severe weather accompanied with more detailed geographic, timing and duration of threat information would mitigate potential impacts from high-impact weather.

Resource Assessment:

The WoF project is currently funded by OAR for \$2.6 million per year and includes testing real-time hourly mesoscale ensemble analyses with 3-hour prediction cycles. The current funding level is insufficient to support the needed resources for computing and personnel to complete the research for sub-hourly high-resolution forecasts and to accelerate the prototype development and testing phase involving NWS forecasters in FY 2016 - FY 2020, with a goal of full implementation into NWS operations by FY 2023.

Schedule and Milestones:

FY 2016

- Increase HPC available to WoF project to enable accomplishment of milestones
- Implement initial WoF system and develop graphical products and tools for use in National Severe Storms Laboratory (NSSL)/Hazardous Weather Testbed (HWT), and ensure these are integrated with the NOAA Forecasting a Continuum of Environmental Threats (FACETs) Program
- Develop initial radar and satellite data quality control (QC)/pre-processing systems for ingest into the WoF system derived from current MRMS implementation at the National Centers for Environmental Prediction (NCEP)

FY 2017

- Begin first tests of improved WoF system in NSSL/HWT with significant feedback and testing by NWS forecasters, including improved products and tools
- Leverage High Resolution Rapid Refresh (HRRR)-ensemble in WoF system as much as possible
- Begin research to develop improved data quality techniques for high temporal resolution, dual-polarized, Doppler radar data (velocity, reflectivity)
- Begin Visiting Scientist Program through an Announcement of Opportunity

FY 2018

- Demonstration of radar and satellite data QC/pre-processing systems for ingest into the WoF system
- Continue to evaluate an improved WoF system in NSSL/HWT with significant feedback and testing by NWS forecasters, including improved products and tools
- Link WoF sub-hourly warning prediction capabilities to existing NOAA hourly updated storm-scale prediction capabilities (i.e., the HRRR model) extending system toward an hourly updated NWP ensemble with ensemble data assimilation
- Continue case studies of significant severe weather events with WoF system and evaluation of different data assimilation methods

FY 2019 – FY 2020

- Test and evaluate all components of the WoF system within NSSL/HWT using NWS forecasters and full-thread experiments with key stakeholders (e.g., emergency managers, media, weather industry, etc.)
- Continue development and improvement of WoF system, including data quality control, ties to HRRR and other operational models, products and tools

- Continue case studies of significant severe weather events with WoF system and evaluation of different data assimilation methods with goal to identify most likely methods and Concept of Operations for NWS operational decision by FY 2020

Deliverables:

- New HPC resources obtained for WoF system
- Deliver a plan for the initial WoF system configuration and to test real-time data streams
- Conduct six week-long experiments with NWS forecasters on a prototype WoF system
- Design of WoF system for NWS operational implementation ready for transition

Performance Goals and Measurement Data:

Performance Measure:	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
Demonstrate extended severe weather warnings through Warn-on-Forecast R&D advances. (Measured in minutes of improvement)							
With Increase	N/A	N/A	6	8	10	14	20
Without Increase	5	5	5	5	5	7	10
Description: These improvements are based upon simulations conducted in the Hazardous Weather Testbed (HWT) of actual weather events. The warning lead-times in the HWT will be compared to NWS warning lead-times for the actual event.							

Performance Measure:	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
Demonstrate extended tornado warnings through Warn-on-Forecast R&D advances. (Measured in minutes of improvement)							
With Increase	N/A	N/A	3	8	13	15	18
Without Increase	1	1	1	5	7	10	10
Description: These improvements are based upon simulations conducted in the Hazardous Weather Testbed of actual weather events. The warning lead-times in the HWT will be compared to NWS warning lead-times for the actual event.							

PROGRAM CHANGE PERSONNEL DETAIL

Budget Program: Office of Oceanic and Atmospheric Research
Sub-program: Weather and Air Chemistry Research
Program Change: Warn on Forecasts

Title:	Location	Grade	Number of Positions	Annual Salary	Total Salaries
Physical Scientist	Norman, OK	ZP-IV	2	82,642	165,284
Subtotal			<u>2</u>		<u>\$165,284</u>
Less Lapse	25%		<u>(1)</u>		<u>(\$41,321)</u>
Total Full-time permanent:			1		\$123,963
2016 Pay Adjustment	1.3%				<u>\$1,612</u>
TOTAL			1		<u>\$125,575</u>
Personnel Data			Number		
Full-time Equivalent Employment					
Full-time permanent			1		
Other than full-time permanent			<u>0</u>		
Total			1		
Authorized Positions:					
Full-time permanent			2		
Other than full-time permanent			<u>0</u>		
Total			2		

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: Office of Oceanic and Atmospheric Research
Sub-program: Weather and Air Chemistry Research
Program Change: Warn-On Forecast

Object Class		FY 2016 Increase	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	125	\$30,027
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	82
11.9	Total personnel compensation	<u>125</u>	<u>30,109</u>
12	Civilian personnel benefits	69	8207
13	Benefits for former personnel	0	407
21	Travel and transportation of persons	15	1009
22	Transportation of things	0	212
23.1	Rental payments to GSA	0	1342
23.2	Rental Payments to others	0	4235
23.3	Communications, utilities and miscellaneous charges	0	983
24	Printing and reproduction	0	294
25.1	Advisory and assistance services	0	1165
25.2	Other services	0	0
25.3	Purchases of goods & services from Gov't accounts	0	0
25.4	Operation and maintenance of facilities	100	203
25.5	Research and development contracts	100	1,401
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	1,496
31	Equipment	1,121	3,212
32	Lands and structures	0	3
33	Investments and loans	0	0
41	Grants, subsidies and contributions	200	19,538
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	<u>1,730</u>	<u>73,816</u>

Due to financial system limitations, the object class detail for the Program reflects the Weather and Air Chemistry Labs and CIs PPA.

Weather and Air Chemistry Laboratories and Cooperative Institutes: Meteorological Assimilation Data Ingest System (Base Funding: \$500,000 and 0 FTE; Program Change: - \$300,000 and 0 FTE): NOAA requests a decrease of \$300,000 and 0 FTE for a total of \$200,000 and 0 FTE to reduce funding used to transition from research the Meteorological Assimilation Data Ingest System (MADIS) into National Weather Service (NWS) operations. Remaining funding will be used run MADIS quasi-operationally in a research test environment, where new advances are developed and tested to MADIS prior to being put into NWS operations.

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: Office of Oceanic and Atmospheric Research
Subactivity: Weather and Air Chemistry Research
Program Change: MADIS

Object Class		FY 2016 Decrease	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	(17)	\$29,885
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	82
11.9	Total personnel compensation	<u>(17)</u>	<u>29,967</u>
12	Civilian personnel benefits	(13)	8125
13	Benefits for former personnel	0	407
21	Travel and transportation of persons	0	976
22	Transportation of things	0	212
23.1	Rental payments to GSA	0	1342
23.2	Rental Payments to others	0	4185
23.3	Communications, utilities and miscellaneous charges	0	983
24	Printing and reproduction	0	294
25.1	Advisory and assistance services	0	1165
25.2	Other services	0	0
25.3	Purchases of goods & services from Gov't accounts	0	0
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	(105)	1,093
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	1,496
31	Equipment	0	1,912
32	Lands and structures	0	3
33	Investments and loans	0	0
41	Grants, subsidies and contributions	(165)	19,626
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	<u>(300)</u>	<u>71,786</u>

Due to financial system limitations, the object class detail for the Program reflects the Weather and Air Chemistry Labs and CIs PPA.

Weather and Air Chemistry Labs and Cooperative Institutes: Increasing Facility Costs (Base Funding \$4,204,000 and 0 FTE; Program Change +\$130,000 and 0 FTE). NOAA requests an increase of \$ 130,000 and 0 FTE for a total of \$4,361,000 and 0 FTE to cover operation and rent increases at the Boulder, Colorado (CO) facility and the National Weather Center (NWC) in Norman, Oklahoma (OK).

Proposed Actions:

The Boulder increase will cover increased management and maintenance costs for the Department of Commerce (DOC) owned campus that NOAA, National Institute of Standards and Technology (NIST), and the National Telecommunications and Information Administration (NTIA) share. The management of this DOC owned property has been delegated to NIST. Costs associated with the management and maintenance of the site are charged to NOAA through an Economy Act Agreement, referred to as the NOAA/NIST/NTIA Cross Services Agreement.

Proposed funding for the NWC will cover increased lease costs. The NWC lease began in August, 2006 and was negotiated through the DOC Real Property Office. The lease cost in 2006 was set based on square footage usage (NOAA space verses the University of Oklahoma space) and expected actual costs incurred to maintain the building and infrastructure. Additional space requirements at the NWC have increased the cost of the lease for NOAA.

Statement of Need and Economic Benefits:

These leases are necessary and recurring costs and must be funded to continue the current level of operations. NOAA continually uses resources conservatively, but has no control over building and utility costs.

Resource Assessment:

Current resources fund the existing lease for OAR activities at the Boulder, CO and Norman, OK complexes. The Weather and Air Chemistry Labs and Cooperative Institute PPA does not have the resources to fund the lease increase delta without impacting research base funding within this PPA.

Schedule and Milestones:

FY 2016

- Begin lease increase

Deliverables:

- Continuity of OAR mission activities

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: Office of Oceanic and Atmospheric Research
Sub-program: Weather and Air Chemistry Research
Program Change: Increasing Facility Costs

Object Class		FY 2016 Increase	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	0	\$0
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	<u>0</u>	<u>0</u>
12	Civilian personnel benefits	0	0
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	0
22	Transportation of things	0	0
23.1	Rental payments to GSA	0	0
23.2	Rental Payments to others	130	4,334
23.3	Communications, utilities and miscellaneous charges	0	0
24	Printing and reproduction	0	0
25.1	Advisory and assistance services	0	0
25.2	Other services	0	0
25.3	Purchases of goods & services from Gov't accounts	0	0
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	0
31	Equipment	0	0
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	0
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	<u>130</u>	<u>4,334</u>

U.S. Weather Research Program: Research to Improve Mid-Range Weather Outlooks (Base Funding: \$ 0 and 0 FTE; Program Change: +\$3,936,000 and + 0 FTE): NOAA

requests an increase of \$3,936,000 and 0 FTE for a total of \$ 11,036,000 and 0 FTE to expand research and development (R&D) to substantially improve the accuracy of NOAA's next-generation global coupled model out through weeks 3 and 4 (mid-range). This narrative is one of two coordinated narratives which will ultimately allow for 30 day weather and water outlooks and longer lead severe storm outlooks.

Proposed Actions:

The FY 2016 request proposes to extend weather outlooks¹⁴ beyond current limits; initial actions will focus on weeks 3 and 4. Addressing this challenge will require a sustained scientific research and research-to-operations effort. This effort includes designing, developing, implementing and operating the multi-model coupled earth system modeling system that will be needed to support effective decision making. Specifically, this request involves:

- Improvements in the representation of key physical processes at required model resolutions,
- coupled data assimilation in which observations in one medium (e.g. ocean) are used to update not only that medium but others (e.g. atmosphere); and coupled modeling in which processes in one medium (e.g. ocean mixing and heat transport) produce changes in others (e.g. atmosphere surface heating); and
- ensemble prediction system improvement, through improved initialization of models in the ensemble and more sophisticated processing of output.

This request includes \$1 million for high performance computing (HPC) capacity to support the modeling effort. It will provide an additional 60 teraflops (TF) of computational capacity and approximately 1/2 petabyte (PB) of additional storage capacity to the planned NOAA compute infrastructure in Fairmont, West Virginia.

Statement of Need and Economic Benefits:

Important decisions in sectors ranging from food security and public health, to emergency management and national security, need additional information farther out than the current ability of 10-14 days. Today, NOAA does not have the ability to make mid-range outlooks better than the climatological average. Specific examples of user needs for mid-range outlook information include:

- Food Security: Regional drought early warning systems are important for the Nation's food security and economy.
- Public Health: Outlooks of impending extreme heat events will inform state and local planning, including emergency management and preparedness.
- Water Resource Management: River flow and river discharge predictions out to 3-4 weeks would assist flood prediction, reservoir management, and hydroelectric power generation.
- Disaster Risk Management: The Federal Emergency Management Agency (FEMA) works closely with NOAA to bridge climate and weather outlooks to inform extreme event disaster preparedness, and to ensure consistent messaging as these events approach.¹⁵

¹⁵ http://www.wmo.int/pages/prog/arep/wwrp/new/documents/S2S_Implem_plan_en.pdf

- Arctic Access and Use: Outlooks of melt-out and freeze-up will be important to the oil and gas industry; outlooks of maritime weather and sea ice weeks in advance will be crucial for safe navigation.¹⁶
- National Security: Security planners need skillful extended range outlooks to assess weather-driven exacerbation of political hotspots and crises, and plan contingencies. International users need improved extended range outlooks for the developing world across sectors including human health (e.g., famine, malaria) and national security.

Resource Assessment:

This is a new initiative and does not have any current funding.

Schedule and Milestones:

FY2016:

- Evaluate physical processes needing improved representation and coupling (e.g. air-ocean, air-land, ice-ocean, air-ice etc.) in existing and follow-on models to improve prediction of physical phenomena
- Begin procurement process for additional HPC capacity in Fairmont, WV

FY2017:

- Evaluate existing coupled model ensemble generation techniques for potential improvement and identify potential model output post-processing techniques with potential for improved assessments of outlook phenomena and outlook uncertainty
- Begin preliminary research and development activities identified in evaluation process to improve the prediction system
- Deliver additional HPC capacity and provide user access to additional capacity

FY2018 - 2020

- Test research from previous years in an operational environment
- Identify research that is ready for transition into operations
- Publish research results in peer-reviewed publications and share results with forecasters and scientists at scientific conferences
- Deliver upgrades to operational modeling suite

Deliverables:

- Create Computer codes needed for improvements to coupled modeling system for transition into operations
- Improved data assimilation schemes for transition into the operational data assimilation system
- Improved model components for transition into the operational coupled modeling system
- Annual publication of research results in peer-reviewed publications and presentations for forecasters

¹⁶ <http://www.arctic.noaa.gov/NOAAarcticactionplan2014.pdf>

Performance Goals and Measurement Data:

Performance Measure: Transitioned upgrades in modeling or data assimilation	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	0	1	2	2	2
Without Increase	0	0	0	0	0	0	0
Description: Upgrades to coupled earth-system models or data assimilation systems capable of participating in experimental Week 3-4 outlook applications.							

Performance Measure: Increase model skill of 500 millibar (mb) outlook for day 21 toward FY 2013 skill at day 14.	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	2%	5%	10%	10%	10%
Without Increase	2%	2%	2%	2%	2%	2%	2%
Description: Extend accuracy for global skill from 5 days to 7 days for winds for 850 hPa and 250 hPa levels. This is working towards making the 21-day outlook as accurate as the 14-day outlook was in 2013.							

Performance Measure: Reduction of 7-day forecast error for 850 and 250 wind forecasts toward 5-day skill (baseline FY 2013).	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	5%	10%	10%	10%	10%
Without Increase	5%	5%	5%	5%	5%	5%	5%
Description: Extend accuracy for global skill from 5 days to 7 days for winds for 850 hPa and 250 hPa levels.							

Performance Measure: Additional compute capability (teraflops)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	60	60	60	60	60
Without Increase	0	0	0	0	0	0	0
Description: This is an estimate of how much compute capability could be obtained with the budget increase.							

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: Oceanic and Atmospheric Research
Sub-program: Weather and Air Chemistry Research
Program Change: Research to Improve Mid-Range Operational Weather Outlooks

Object Class		2016 Increase	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	600	\$600
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	600	600
12	Civilian personnel benefits	180	180
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	50	50
22	Transportation of things	0	0
23.1	Rental payments to GSA	0	0
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and miscellaneous charges	0	0
24	Printing and reproduction	0	0
25.1	Advisory and assistance services	300	300
25.2	Other services	1,000	1,000
25.3	Purchases of goods & services from Gov't accounts	0	0
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	0
31	Equipment	300	300
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	1,506	1,506
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	3,936	3,936

U.S. Weather Research Program: Improving the Airborne Detection and Understanding of Severe Weather (Base Funding: \$0 and 0TE; Program Change: +\$5,000,000 and +1 FTE): NOAA requests an increase of \$5,000,000 and 1 FTE for a total of \$5,000,000 and 1 FTE to conduct research and development on improving the detection and understanding of severe weather with a new airborne phased array radar (APAR) and other airborne measurements.

Proposed Actions:

The proposed investment will enable NOAA and its partners to research and develop advanced methods of aircraft-based hazardous weather observation, which will provide critical information about severe storms, tropical storms (hurricanes) and heavy precipitation storms, for more accurate public warnings and forecasts.

Airborne Doppler radar measurements currently provide critical location and intensity information about these storms, especially over the open ocean or rugged terrain, where other radar information does not exist. Forecasters around the world utilize these radar observations, combined with satellite data and other environmental observations, to study storms and generate predictions of storm intensity and direction. However, NOAA cannot fully take advantage of current technology due to mounting restrictions on aircrafts. Therefore, this proposed investment will initially focus on the research and development of an airborne radar system which will provide more data, which is more accurate, and can be utilized on a NOAA aircraft.

Requested FY 2016 funding will be used to examine the potential benefits of APAR for providing the real-time data needed for National Weather Service (NWS) forecasts and warnings and to determine how the additional, advanced capabilities of APAR can improve forecasts in the future. OAR will work with the research community to initially develop, and demonstrate the feasibility of using APAR for collecting airborne radar measurements in hazardous weather environments, including hurricanes and severe local storms. Additionally, NOAA and its partners will use these measurements to conduct research focused on understanding severe storms and improving NOAA's predictions and warnings for the public. It is expected that, through this effort, future opportunities to develop and test other airborne observing systems, besides radar, will emerge and ensure that NOAA has best airborne observing platform for hazardous weather events.

Statement of Need and Economic Benefits:

While NOAA's current generation of airborne radars continues to provide valuable storm information, major advancements in radar technology development have demonstrated significant improvements in weather detection. Specifically, radar research related to severe thunderstorm detection has shown that far more storm details with faster updates from within severe storms can be obtained from the use of dual-polarization phased array radar. While these studies have focused on ground-based radars, other research has suggested that an APAR is a feasible¹⁷ alternative for airborne applications. Such radar would double the amount of detail that can be gathered along the plane's flight path, with greatly reduced signal loss in heavy precipitation. Because of dual-polarization capability, APAR technology has the ability to distinguish raindrops, ice crystals, and snowflakes from each other, helping improve observations and predictions of dangerous heavy rain and snow events. In addition to the significant improvements in detection, phased array radars use flat plates to send and receive

¹⁷ Vivekanandan, J., W.-C. Lee, E. Loew, J.L. Salazar, V. Grubisic, J. Moore, and P. Tsai, 2014: The Next Generation Airborne Polarimetric Doppler Weather Radar, Geosci. Instrum. Method. Data Syst., 3, 1-16.

signals, making them very adaptable for attaching to the body of an aircraft. This is an important aspect of this radar design for aircraft used for weather observations since approximately 90 percent of the current fleet used for tropical storm reconnaissance (C-130s) cannot house a radar system in the tail of the aircraft as is currently done in NOAA's WP-3D aircraft and its G-IV research aircraft. Additional storm information from more reconnaissance flights would improve NOAA's forecasts and warnings of these storms.

NOAA relies heavily on aircraft to observe hazardous weather, including hurricanes and severe local storms, particularly over the open ocean. While the data provided by airborne Doppler radar has been shown to be very important in improving the understanding of severe weather and improving the prediction of hurricanes¹⁸, 90 percent of the fleet that the U.S. uses to observe tropical storms and hurricanes over the open ocean, does not have radar onboard. Additionally, the tail Doppler radars that are currently installed on NOAA's fleet do not observe as much information about storms as is possible with today's radar technologies. Increase in understanding of storm behavior will lead to improved prediction of location and intensity of tropical storms and hurricanes when they make landfall. Such improved predictions will save money spent on unnecessary coastal evacuations, which can exceed millions of dollars per storm. In addition, APAR technology is expected to improve understanding of severe storm situations similar to the derecho that impacted the Ohio Valley and mid-Atlantic region in July 2014 and the devastating flash flooding event in Boulder County, Colorado in September 2014. This understanding will lead to improvements in the computer models used to predict these severe storm events.

Resources Assessment:

This is a new investment. NOAA does not have any resources dedicated to the development of new airborne observing systems.

Schedule and Milestones:

FY 2016

- Conduct planning meetings with partners
- Begin development of prototype system
- Begin observing system simulation experiments (OSSEs) to evaluate impact of APAR spatial and temporal scanning strategies to guide development and evaluation

FY 2017

- Begin testing of an APAR prototype
- Continue OSSEs

FY 2018

- Evaluate testing, apply improvements to prototype and continue with demonstration and testing for storm environments
- Begin evaluation of electronic scanning impact over the traditional NOAA radar systems.
- Complete OSSEs
- Host scientific seminars to discuss APAR research results with NOAA and academic scientists and forecasters. (FY 2018-FY 2020)

FY 2019

- Conduct observational case studies of hurricanes, and, if feasible, other severe storm environments to investigate the importance of sampling time and dual-polarization impact

¹⁸ Zhang, F., Y. Weng, J. F. Gamache, and F. D. Marks, 2011: Performance of convection-permitting hurricane initialization and prediction during 2008–2010 with ensemble data assimilation of inner-core airborne Doppler radar observations, *Geophys. Res. Lett.*, **38**, L15810, doi: <http://dx.doi.org/10.1029/2011GL048469>

- Evaluate FY2018 field results and determine if additional testing or improvements are necessary
- Begin evaluation of APAR impact on real-time data transmission and forecast improvements

FY 2020

- Identify other promising airborne observing platforms for evaluation in subsequent years
- Evaluate FY 2019 field results and determine if additional testing or improvements are necessary
- Begin to evaluate potential of APAR technology to be transitioned into operations by the mid to late 2020's

Deliverables:

- Prototype products available for transfer into NOAA operations
- Computer code for improved numerical weather models
- Test/evaluation of APAR characteristics and performance
- Test/evaluation of APAR dual-polarization antenna characteristics and performance
- Studies completed to assess APAR antenna array configurations for hazardous weather studies and operational implementation
- Transition of critical technologies, model improvements, and service applications to NOAA's operational entities

Performance Goals and Measurement Data:

Performance Measure:	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
Expand number of observing platforms evaluated in a year.							
With Increase	N/A	N/A	2	3	4	4	4
Without Increase	N/A	1	1	2	3	3	3

PROGRAM CHANGE PERSONNEL DETAIL

Program: Office of Oceanic and Atmospheric Research
Sub-program: Weather and Air Chemistry Research
Program Change: Improving the Airborne Detection and Understanding of Severe Weather

Title:	Location	Grade	Number of Positions	Annual Salary	Total Salaries
Physical Scientist	Silver Spring, MD	ZP-IV	1	\$89,924	\$89,924
Subtotal			<u>1</u>		<u>\$89,924</u>
Less Lapse	25%		<u>0</u>		<u>(\$22,481)</u>
Total Full-time permanent:			1		\$67,443
2016 Pay Adjustment	1.3%				\$877
TOTAL			1		\$68,320
Personnel Data			Number		
Full-time Equivalent Employment					
Full-time permanent			1		
Other than full-time permanent			<u>0</u>		
Total			1		
Authorized Positions:					
Full-time permanent			1		
Other than full-time permanent			<u>0</u>		
Total			1		

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: Office of Oceanic and Atmospheric Research
Sub-program: Weather and Air Chemistry Research
Program Change: Improving the Airborne Detection and Understanding of Severe Weather

Object Class		FY 2016 Increase	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	\$330	\$330
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	330	330
12	Civilian personnel benefits	110	110
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	40	40
22	Transportation of things	40	40
23.1	Rental payments to GSA	0	0
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and miscellaneous charges	0	0
24	Printing and reproduction	0	0
25.1	Advisory and assistance services	0	0
25.2	Other services	321	321
25.3	Purchases of goods & services from Gov't accounts	0	0
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	0
31	Equipment	50	50
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	4,109	4,109
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	5,000	5,000

Tornado Severe Storm Research/Phased Array Radar: Multi-Function Phased Array Radar (MPAR) (Base Funding: \$13,500,000 and 0 FTE; Program Change: -\$342,000 and 0 FTE):

NOAA requests a decrease of \$389,000 and 0 FTE for a total of \$13,158,000 and 0 FTE. The request restores Multi-Function Phased Array Radar (MPAR) to the FY 2016 President's Budget level. NOAA is using congressionally directed funding as indicated in the Consolidated and Further Continuing Appropriations Act of FY 2015 to expand MPAR Research and Development activities by kick-starting an all-digital radar design effort with the University of Oklahoma's Advanced Radar Research Center.

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: Office of Oceanic and Atmospheric Research
Subactivity: Weather and Air Chemistry Research
Program Change: MPAR

Object Class		FY 2016 Decrease	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	0	\$0
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	<u>0</u>	<u>0</u>
12	Civilian personnel benefits	0	0
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	48
22	Transportation of things	0	4
23.1	Rental payments to GSA	0	0
23.2	Rental Payments to others	0	240
23.3	Communications, utilities and miscellaneous charges	0	0
24	Printing and reproduction	0	4
25.1	Advisory and assistance services	0	0
25.2	Other services	0	597
25.3	Purchases of goods & services from Gov't accounts	0	24
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts		4,000
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	0
31	Equipment	0	192
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	(342)	8,049
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	<u>(342)</u>	<u>13,158</u>

APPROPRIATION ACCOUNT: OPERATIONS, RESEARCH, AND FACILITIES
SUB-PROGRAM: OCEAN, COASTAL, AND GREAT LAKES RESEARCH

The objectives of the Ocean, Coastal, and Great Lakes Research sub-program are to:

- Improve understanding of the physics, chemistry, and ecology of oceanic, coastal, and Great Lakes systems, including changes in these environments and the impacts of stressors such as changes in temperature, changes in ocean and Great Lakes chemistry, pollution, and invasive species;
- Improve predictive capability for oceanic, coastal, and Great Lakes processes, including developing predictive models for ecosystems, and coupling these with physical and biogeochemical models to create comprehensive Earth System Models for these environments;
- Translate ocean, coastal, and Great Lakes science into services through tools developed for resource managers, policy makers and the public, and through increased education and outreach; and
- Develop and use cutting edge technology for understanding and exploring the ocean, coasts and Great Lakes.

The ocean, coasts, and Great Lakes are closely tied to the Earth's weather and climate, and a sound understanding of these environments is essential to NOAA's research portfolio as a whole. OAR addresses this activity through core programs, which include the National Sea Grant College Program, the Office of Ocean Exploration and Research, NOAA's Ocean Acidification Program, Sustained Ocean Observations managed by the Climate Program Office, as well as through research conducted at OAR Laboratories and Cooperative Institutes. OAR's ocean, coastal, and Great Lakes programs are diverse, unique and essential to NOAA's mission. They provide science to coastal communities from a wide network of university partners, develop and use cutting edge technology to explore the depths of the ocean and share that world with scientists and the public, and accelerate the understanding of changes in the oceans and Great Lakes.

LABORATORIES AND COOPERATIVE INSTITUTES

Great Lakes Environmental Research Laboratory (GLERL)

Research conducted at GLERL advances understanding of the physical, chemical, and biological processes in the lakes, and how they affect ecosystem dynamics. This knowledge leads to the development of information and tools for coastal constituents and Federal, state, and international decision and policy makers. GLERL's three main areas of research include: observing systems and advanced technology, ecosystem dynamics, and ecological modeling and forecasting.

Pacific Marine Environmental Laboratory (PMEL)

PMEL conducts interdisciplinary scientific investigations in oceanography and atmospheric science. PMEL has four major research programs that fall under the sub-program of Ocean, Coastal, and Great Lakes Research: Ecosystems and Fisheries Oceanography Coordinated Investigations (Eco-FOCI), the Acoustics program, the Earth-Ocean Interactions (EOI) program, and Ocean Acidification research (details below under Other Ecosystem Programs).

Atlantic Oceanographic and Meteorological Laboratory (AOML)

AOML is a multi-disciplinary laboratory, with research spanning the topics of hurricanes, coastal ecosystems, oceans and human health, climate studies, global carbon systems, and ocean

observations. AOML's research programs are augmented by the Cooperative Institute for Marine and Atmospheric Studies (CIMAS), which is a nine-member consortium of academic institutions in Florida and the Caribbean.

Schedule and Milestones:

FY 2016 - 2020

- Establish and maintain long-term complementary data sets coincident with each reef-based ocean acidification observing platform
- Conduct regular cruises and sampling for monitoring of nutrients, microbes, Colored Dissolved Organic Matter (CDOM), and other anthropogenic source material that threaten the sustainability of coastal ecosystems
- Maintain observation network including biophysical moorings at two stations for the Distributed Biological Observatory
- Continue collection and analysis of acoustic data from Ocean Noise Reference Stations, in coordination with NMFS and NOS
- Conduct expedition to the New Millennium Observatory/Ocean Observatories Initiative (NeMO/OOI) cabled observatory on Axial Seamount to acquire data for eruption forecasting
- Conduct ecosystem Assessment for the Gulf of Mexico
- Initiate multidisciplinary exploration and research to locate and characterize hydrothermal vents in the unexplored parts of the Mariana Trench Marine National Monument
- Maintain an array of biophysical moorings in the Bering Sea
- Development of new autonomous platforms and sensing technologies capable of operating around and under Arctic sea ice
- Incorporate new Multiple Opening/Closing Net and Environmental Sensing System (MOCNESS) for collecting plankton and larval fish samples into experiments and ongoing ecological monitoring of the Great Lakes

FY 2016

- Complete field work, analysis and synthesis of work in the Chukchi Sea
- Perform data analysis and evaluation of models for IPCC Assessment Report on Arctic (including Bering Sea) sea ice and temperature

FY 2017

- Perform data analysis and evaluation of models for IPCC Assessment Report on Arctic (including Bering Sea) sea ice and temperature, and complete Sixth Assessment Report

Deliverables:

- Automated and validated ecological forecasts of coral bleaching as a result of data integration through the ICON program
- An integrated conceptual ecosystem model and indicator set for south Florida coastal waters
- Technical Report to describe current and chemical (nutrient) distributions in coastal waters in relation to known point sources (inlets and waste-water outfalls), to assist in assessing relative strengths of land-based sources of pollution over southeast Florida reef tracks
- Pre-operational forecast products to protecting the drinking water quality of over two million coastal Lake Erie residents from algal toxins
- An annual, synthetic, ecosystem-based assessment of the eastern Bering Sea published in the Ecosystem Considerations Chapter of the Stock Assessment and Fishery Evaluation reports delivered to the North Pacific Fisheries Management Council

- Annual Arctic Report Card and outreach video
- Coupled trophic model for use in ecosystem assessments for the Bering Sea
- Updated forecast of the timing of the next eruption at Axial Seamount, the NeMO and Ocean Observatory Initiative (OOI) seafloor observatory site in the Northeast Pacific
- Annual synthesis of data and scientific results derived from EOI sensors and systems on the OOI cabled observatory at Axial Seamount and those derived from exploration, ecosystem characterization, and ocean acidification research and experiments at submarine volcanoes in the Marianas region and other relevant sites
- Demonstration of new platforms and sensors capable of operating around and under Arctic sea ice

Performance Goals and Measurement Data:

Performance Measure:	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
Increase percentage of coral bleaching events successfully forecasted at monitored sites that support management decisions (AOML contribution)	82%	84%	86%	88%	90%	92%	93%
<p>Description: This performance measure is for the continued improvement and production of coral bleaching forecasts used to identify events and support management decisions. Forecasts are developed at AOML using oceanographic data from <i>in situ</i> sensors at U.S. sites and validated in the field by host site collaborators. By comparing observations of bleaching with predictions made, the hit rate and false alarm rate of predictions can be calculated and used to compute the Peirce skill score, which is a measure of skill obtained by the difference between the hit rate and the false alarm rate. This metric can be used to compare different predictive techniques and measure improvements.</p>							

Performance Measure: Cumulative number of coastal, marine and Great Lakes issue-based forecasting capabilities developed and used for management. (AOML contribution) (Measure 3.3d)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	10	10	11	12	12	13	13
Description: This performance measure is for the Integrated Coral Observing Network (ICON) Project and includes 1) ecoforecasts and 2) continued long-term data collection. This performance measure is for the continued development and production of coral bleaching forecasts used to identify events and support management decisions. Forecasts are produced hourly using sea temperature and other oceanographic data collected from satellites at 10 virtual stations, including the following U.S. sites: the Florida Keys National Marine Sanctuary, the La Parguera Estuarine Preserve, and the Salt River Bay National Historical Ecological Preserve, and Laolao Bay. The raw data are submitted to NOAA's Coral Reef Conservation Program, and the bleaching forecasts are archived on servers at AOML.							

Performance Measure: Annual number of coastal, marine, and Great Lakes ecosystem sites adequately characterized for management (GLERL contribution only) (Measure 3.3c)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	11	17	20	20	20	20	20
Description: This performance measure is associated with Measure 18a and reflects GLERL contribution only. The measure is for further development and validation, by GLERL, of a harmful algal bloom tracking and warning system providing real-time results to water intake managers protecting the drinking water of over 2 million coastal Lake Erie residents. <i>Microcystis aeruginosa</i> is the dominant bloom-forming, toxic cyanobacterium occurring in the Great Lakes. Preliminary studies have verified the presence of the cyanotoxin, microcystin in Lake Erie near water intake systems. In particular, microcystin concentrations have exceeded the recommended limit of 1 µg/L for drinking water (World Health Organization, 1998). This research will provide improved predictive models and forecast products using in-water and remote (aircraft and satellite) environmental data. This NOAA-wide performance measure is highlighting only one GLERL component. NOAA will continue to expand the number of ecosystems characterized for management.							

Performance Measure: Maintain annual number of ecosystem indicators contributed to the eastern Bering Sea Report Card	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	3	3	3	3	3	3	3
Description: EcoFOCI will provide indicators of ecosystem health for the eastern Bering Sea to the annual publication of the Ecosystem Considerations chapter of the SAFE report to the North Pacific Fishery Management Council and for individual species stock assessments.							

Performance Measure: Annual number of coastal, marine and Great Lakes ecosystem sites adequately characterized for management (PMEL contribution only) (Measure 3.3c)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	2	2	2	2	2	2	2
Description: PMEL's interdisciplinary exploration and research will discover and characterize ecosystem diversity as well as provide new scientific data for understanding their critical relationships with ecosystems in the upper ocean's sunlit zone. Emphasis will be on discovery and characterization of hydrothermal ecosystem relationships to important NOAA goals including understanding ocean acidification, discovery, and understanding of sources and sinks for carbon (particularly carbon dioxide) and ocean nutrient sources and cycles. All of these efforts are essential to enable NOAA to achieve a holistic understanding of the global ocean ecosystem.							

Performance Measure: Demonstration/testing of new technologies (annual)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	N/A	0	1	2	1	2	1
Description: Successful demonstration of new technologies will depend on the degree of difficulty in the development of those technologies. OAR plans on introducing early in the process some technologies that will be further developed to produce some return in a one-year timeframe. More complex technologies can require five years or more to bring to an operational demonstration status.							

NATIONAL SEA GRANT COLLEGE PROGRAM

The National Sea Grant College Program (Sea Grant) was established by Congress in 1966 (reauthorized in 2008) to enhance the practical use and conservation of coastal, marine, and Great Lake resources in order to create a sustainable economy and environment. The 33 state Sea Grant programs are located in every coastal and Great Lakes state, Puerto Rico, and Guam, forming a dynamic national network of more than 300 participating institutions represented by more than 2,300 scientists, engineers and outreach experts. As a non-regulatory program, Sea Grant focuses on generating and disseminating science-based information to a wide range of groups who require scientific information to make daily decisions, including commercial and recreational fishermen, finfish and shellfish farmers, state and local planning officials, port and harbor commissioners, seafood processors and retailers, and natural resource, water, and environmental quality managers. Many Sea Grant personnel live and work in the coastal communities they serve; thus, they are both trusted community residents and coastal experts who provide innovative and reliable science-based information to identify locally relevant solutions to critical coastal issues.

Sea Grant's program activities fall into the following four focus areas:

- Sea Grant ***Healthy Coastal Ecosystems*** objectives are to improve ecosystem services by enhanced health, diversity and abundance of fish, wildlife and plants, and to assist coastal managers use ecosystem-based approaches to manage land, water, coastal habitat, and living marine resources.
- Sea Grant ***Environmental Literacy and Workforce Development*** objectives are to: (1) Provide national leadership in ensuring public literacy in marine and coastal issues; and (2) Develop professionals who understand marine and aquatic science.
- Sea Grant ***Resilient Communities and Economies*** objectives are to develop vibrant and resilient coastal economies that use comprehensive planning to make informed strategic decisions, improve coastal water resources that sustain human health and ecosystem services, and adapt to the impacts of coastal hazards.
- Sea Grant ***Sustainable Fisheries and Aquaculture*** objectives are to meet public demand with a safe, secure and sustainable supply of seafood, and consumers who understand the health benefits of seafood consumption and how to evaluate the safety and sustainability of the seafood they buy.

Marine Aquaculture Program

The Sea Grant Marine Aquaculture Program works with NOAA Line Offices (the National Marine Fisheries Service (NMFS) in particular) to support sustainable aquaculture through integrated research and technology transfer. The program focuses on key scientific, engineering, environmental, and socioeconomic challenges facing this nascent industry in order to meet the demand for seafood, create and sustain jobs to stabilize coastal working waterfronts, and support efforts to manage and rebuild wild fish stocks.

Schedule and Milestones:

FY 2016 – 2020

- State programs hold local and regional requests for proposals
- Initiate 10 new projects to improve understanding of wind, solar, tidal, and wave energy, production, siting, and socioeconomic and/or environmental effects
- Review all 32 programs against their program plans through external Performance Review Panels
- Complete 66 community climate adaptation projects across the Nation by FY 2016

- Produce an inventory of university-based research and extension personnel regularly involved in projects, activities, and research efforts directed at tourism matters
- Create or retain over 47,225 jobs between 2016 - 2020 as a result of Sea Grant research and outreach in renewable energy, aquaculture, biotechnology, and other emerging industries
- Carry out 20 locally-focused research projects on the impacts of ocean acidification on coastal ecosystems and on commercially important species by FY 2018
- Carry out 50 locally-focused research projects each year to develop techniques and knowledge that will enhance the resilience of coastal communities to economic and environmental hazards

Deliverables:

- 2.4 million resource managers, decision makers, and the general public attend Sea Grant sponsored/organized conferences, workshops, and meetings
- Sea Grant will have leveraged nearly \$200 million from state and other partners
- 100 coastal communities will have implemented climate adaptation measures
- 15,600 conferences, workshops and meetings will have been sponsored /organized by Sea Grant
- 70 peer-reviewed articles/book chapters per year
- A domestic aquaculture industry finds alternative sources of feed materials to reduce pressure on wild harvested feed fish species
- At least one major aquaculture company will implement new approaches to seafood production that benefits from Sea Grant research and extension on integrated multi-trophic aquaculture
- Create and transfer at least 200 decision-support tools/technologies to coastal managers per year
- Complete training of more than 3,000 seafood processors in Hazard Analysis Critical Control Point per year
- More than 2,800 acres of degraded ecosystems are restored due to Sea Grant activities (per year)
- Engage more than 550 coastal communities in activities (e.g. visioning, resource inventories, analysis of development policies) that address the sustainability of economic and environmental resources
- Provide 150,000 coastal resource managers with information/training in local hazard resiliency, and hazard mitigation tools, techniques, and best practices
- Assist 200 coastal communities to adopt sustainable development principles
- Approximately 400 peer-reviewed journal articles/book chapters per year

Performance Goals and Measurement Data:

Performance Measure: Measure annual economic and societal benefits derived from Sea Grant activities	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
Jobs created/retained	17,500	9,600	9,600	9,600	9,600	9,600	9,600
Businesses created/retained	6,500	2,000	2,000	2,000	2,000	2,000	2,000
Economic benefit (millions of dollars)	450	320	320	320	320	320	320
Description: Society benefits from Sea Grant's assistance in developing new businesses/jobs and retaining existing businesses/jobs. This measure also tracks economic (market and non-market) benefits from the development of new ocean, coastal, and Great Lakes resources and technology.							

Performance Measure: Maintain annual number of coastal communities that adopt/implement hazard resiliency practices to prepare for and respond to/minimize coastal hazardous events	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	300	200	200	200	200	200	200
Description: This metric tracks Sea Grant's contribution to individuals, businesses, and communities that develop comprehensive emergency preparedness and response plans to increase their resiliency and enable them to respond effectively. Sea Grant will contribute to this by building a sound knowledge base to improve forecasting capabilities, by identifying development and best management practices that reduce the vulnerability of people, buildings, and businesses to coastal hazards, and by advancing ways communities can manage and recover from these events when they occur.							

Performance Measure: Improve percentage of U.S. coastal states and territories demonstrating 20% or more annual improvements in resilience capacity to weather and climate hazards (%/yr) (Measure 3.3g)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	46%	51%	57%	63%	69%	74%	74%
Description: This measure tracks a range of contributions to address coastal community risk, vulnerability, and resilience to coastal hazards. It quantifies NOAA's contributions to this important goal across NOAA's coastal programs, measuring how NOAA is improving the Nation's capacity for resilience to hazards and is contributing significantly to NOAA's efforts to improve integration of its coastal programs, and expanding beyond the three coastal integration programs providing inputs to the measure (Coastal Services Center, Office of Ocean, Coastal, and Resource Management, and Sea Grant).							

Performance Measure: Monitor annual number of coastal communities that have adopted/implemented sustainable development practices and policies as a result of Sea Grant activities	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	220	480	882	480	480	480	480
Description: This metric tracks communities that have made strides in sustainable development with Sea Grant aid – moving beyond analysis and planning into implementation.							

Performance Measure: Maintain annual number of fishermen, resource managers, consumers, and seafood businesses (harvesters, aquaculturists, processors, and recreational fishermen) who modify their practices using knowledge gained in fisheries sustainability, seafood safety, and the health benefits of seafood	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	53,000	125,000	125,000	125,000	125,000	125,000	125,000
Description: This measure tracks Sea Grant success in having stakeholders adopt responsible fishery practices. For example, Sea Grant efforts to educate fishermen on the benefits of using circle hooks as an alternative to j-hooks has decreased by-catch and increased the survival of hooked and released fish. Responsible harvesting and processing techniques and practices include measures to minimize by-catch and habitat destruction, ensure seafood safety, and support sustainability.							

Performance Measure: Increase cumulative number of regionally-focused climate impacts and adaptation studies, tools, and capacity-building utilized by coastal emergency management	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	7	8	10	12	14	16	18
Description: This measure tracks the cumulative number of regionally-focused climate impacts and adaption studies, tools, and capacity-building utilized by coastal and emergency management. The use of these products will improve management responses to climate change.							

Performance Measure: Increase cumulative number of tools, technologies, and information services that are used by NOAA partners/customers to improve ecosystem-based management (2010 baseline)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	1840	2340	2840	3340	3840	4340	4840
Description: This measure tracks success in translating research findings into tools, technologies and information services that improve the use and management of coastal, ocean, and Great Lakes ecosystems. Examples of tools include: land cover data, benthic habitat maps, and environmental sensitivity index maps. Technologies refer to the transfer of new or underused approaches for addressing coastal management (e.g., remote sensing, biosensors, autonomous underwater vehicles, genetic markers for fishery stocks) and resource development (e.g., culture systems for aquaculture, marine pharmaceuticals). This includes the application of technology to coastal resource management through synthesis, integration, training, and the development of new management tools.							

Performance Measure: Identify annual number of coastal communities that have restored degraded ecosystems as a result of Sea Grant activities	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	408	260	260	260	260	260	260
Description: The number of coastal communities (including cities, municipalities, small towns even if unincorporated, and neighborhoods if they have a cohesive identity) that have undertaken activities for the purpose of restoring degraded ecosystems, and have succeeded in the goals of that activity. A community that undertakes a project with the goal of partial restoration of an ecosystem, and that significantly meets its goals, would count toward this performance measure even though the ecosystem was not completely restored.							

OCEAN EXPLORATION AND RESEARCH (OER)

OER focuses on unknown and poorly known ocean areas and phenomena, with an emphasis on regions that are a priority to the Nation. OER supports scientific baseline characterizations, as well as efforts to transition and apply the results to stimulate further research and to support natural resource management decisions.

OER develops and uses leading-edge technology and sensors to explore the ocean. OER also manages the information acquired by that technology and generates the knowledge necessary to educate the public and inform environmental resource managers and policy makers on the use and preservation of ocean resources. The information gained contributes to critical ocean issues such as global climate change, ocean acidification, biodiversity, new ocean resources such as discovery of new medicines, and coastal and marine spatial planning. OER core activities include: (1) supporting interdisciplinary expeditions to characterize new ocean areas and phenomena; (2) conducting cutting edge transformational research to address National priorities and to identify new and emerging issues; (3) working with partners to develop new technologies focused on increasing the pace and efficiency of ocean exploration and research; and (4) engaging a broad spectrum of stakeholders and audiences through education and outreach.

OER efforts focus on the first step of the scientific process – initial investigation of the unknown to characterize natural features and phenomena. Areas to be explored are identified by working with other NOAA programs and Federal agencies, as well as the academic community, and emphasis is given to areas where there is consensus that the need for information is critical, and the potential for discovery is high.

Results include a rich variety of products such as peer-reviewed scientific reports and journal articles, maps and geospatial databases and models, inventories and samples of living and non-living marine resources, oceanographic and atmospheric data, and multimedia products such as video and still images. These results provide a critical baseline of knowledge which serves to catalyze new lines of research and inquiry, supports management decisions at multiple scales, and improves ocean literacy and stewardship through education and outreach. OER accomplishes its mission in the following distinct ways:

- **Core Exploration Program:** OER provides funding through competitive extramural grants and intra- and interagency transfers to interdisciplinary teams of scientists, explorers and educators focusing on exploring natural environments and phenomena, searching for and identifying shipwrecks and submerged paleo-landscapes once inhabited by humans, and development of advanced underwater technologies.
- **NOAA Ship *Okeanos Explorer*:** The NOAA ship *Okeanos Explorer* is outfitted with three unique mission systems designed specifically for exploration: (1) deep-ocean high-resolution multibeam sonar mapping; (2) deep-water high-definition videotaping, sensing and sampling using a sophisticated dual-body remotely-operated vehicle (ROV); and (3) a satellite-based broad-band transmission “telepresence” capability, to allow teams of scientists to lead expeditions from shore-based “Exploration Command Centers” (ECC) and to engage the public in the real-time ocean exploration and discovery with live transmissions from the seafloor.
- **Partnership Projects:** OER invests in a variety of small- and large-scale projects with Federal and non-Federal partners who have a shared interest in ocean exploration, as well as funding they can apply to leverage the OER investment. Examples of large-scale, multiyear exploration partnerships include telepresence, Extended Continental Shelf Mapping (ECS), and National Oceanographic Partnership Program (NOPP).

- Engagement: A core component of OER’s mission is to engage a broad spectrum of stakeholders and audiences in innovative ways; using the mystery and excitement of exploring new territories to build interest in careers that support ocean-related work.

Schedule and Milestones:

FY 2016 – 2020

- Conduct one interagency partnership) expedition per year to explore and characterize habitats and ecosystems in deep water areas
- Develop an annual extramural competition for conducting the next phase of research into the potential resources and natural habitats in areas identified through the ECS Mapping Initiative
- Develop an annual extramural competition for the exploration of unknown and poorly known ocean areas where there is a high potential for discovery

Deliverables:

- Conduct expeditions to locate, map, and prepare baseline characterizations of new habitats and ecosystems, as well as to identify and evaluate new marine resources in the potential ECS
- Complete one BOEM-NOAA Partnership expedition to explore and characterize habitats and ecosystems the Arctic and other key areas within the U.S. EEZ
- Conduct Autonomous Underwater Vehicle (AUV) mapping and habitat characterization surveys
- Conduct an increased number of telepresence-enabled systematic expeditions providing opportunities to engage a multitude of shore-based stakeholders and other users in real-time ocean exploration

Performance Goals and Measurement Data:

Performance Measure:	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
Annual number of coastal, marine and Great Lakes ecological characterizations that meet management needs (Measure 3.3c, OER contribution only – number of expeditions per year)	2	2	2	2	2	2	2
Description: Conduct joint expeditions with DOI’s BOEM, USGS and other partners to explore and characterize habitats and ecosystems in deep water areas of the Gulf of Mexico, the Mid-Atlantic Bight, the Arctic, and other high priority areas.							

Performance Measure: Annual number of coastal, marine and Great Lakes ecological characterizations that meet management needs (Measure 3.3c. OER contribution only – number of bathymetric expeditions per year)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	1	2	2	2	N/A	N/A	N/A
Description: The Extended Continental Shelf mapping (ECS) effort is a high-level interagency multi-year effort to define the potential extension of the U.S. continental shelf under international law. Conduct mapping and ecosystem surveys per ECS task force directives. The ECS bathymetric mapping effort is expected to conclude by 2017. Within NOAA, OER intends to use this information strategically to make informed decisions regarding comprehensive exploration and research.							

Performance Measure: Annual number of coastal, marine and Great Lakes ecological characterizations that meet management needs (Measure 3.3c, OER contribution only – number of interdisciplinary expeditions per year)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	3	3	3	3	3	3	3
Description: ECS is an important, high-level interagency multi-year effort. This PM shows the continuation of ECS work after the bathymetric work has concluded, as shown in the above PM.							

Performance Measure: Annual number of coastal, marine and Great Lakes ecological characterizations that meet management needs (Measure 3.3c, OER contribution only – number of expeditions per year.)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	1	1	1	1	1	1	1
Description: Conduct joint interdisciplinary expeditions with CIOERT, NOAA/NOS/NCCOS, CIMAS, NIUST and other partners to explore and prepare baseline characterizations of mesophotic habitats and ecosystems in the Gulf of Mexico, South Atlantic Bight, and Caribbean. Expeditions may also include discovery of maritime heritage sites significant to American and world history using the latest in advanced technology. Sites include shipwrecks, prehistoric submerged landscapes, and other maritime cultural sites.							

Performance Measure: Annual number of coastal, marine and Great Lakes ecological characterizations that meet management needs (Measure 3.3c, OER contribution only – number of expeditions per year.)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	8	8	8	8	8	8	8
Description: Conduct systematic exploration, mapping and characterization of unknown areas in national and international waters using the NOAA Ship <i>Okeanos Explorer</i> Program and provide information and products to multiple users through telepresence links. The <i>Okeanos Explorer</i> offers a new approach to discovery: systematic exploration. This approach includes: (a) telepresence, the ability to bring scientific expertise virtually to the vessel through live connections between shore and sea, (b) a next-generation multi-beam sonar system, and (c) a highly sophisticated remotely operated vehicle (ROV). The ship's telepresence system delivers live images from the ship's ROV and maps from its multi-beam sonar to support live interactions between the <i>Okeanos Explorer</i> and centers located throughout the world.							

Performance Measure: Number of tools, technologies, and information services that are used by NOAA partners/customers to improve ecosystem-based management (OER contribution to Measure 3.3e)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	3	3	3	3	3	3	3
Description: Work towards this performance measure represents the cumulative number of projects OER partners/customers that use the cutting edge exploration technologies mission systems on the NOAA Ship <i>Okeanos Explorer</i> and associated shore-based network, as well as the data collection, processing and dissemination tools developed in partnership with NESDIS.							

Performance Measure: Annually prepare engagement products expressly tied to OER's mission for use by a diversity of stakeholders and audiences to enhance ocean science literacy	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	8	8	8	8	8	8	8
Description: The goal of OER's engagement strategy and products is to increase access to, understanding of, and appreciation for systematic deep-ocean exploration and its importance in forming the baseline for ocean research, management, and policy decisions.							

OTHER ECOSYSTEMS PROGRAMS

NOAA Ocean Acidification Program (OAP)

Ocean acidification (OA) refers to changes in the carbonate chemistry of the ocean, specifically the lowering of the pH. About a third of the carbon dioxide in the atmosphere dissolves into the ocean. The increase of global carbon dioxide levels since the industrial revolution is the main driver of ocean acidification, which in turn affects marine ecosystems. Other factors include upwelling, riverine discharge, nutrient loading and hypoxia. Understanding OA and predicting the consequences for marine resources is necessary for informing national and international carbon mitigation discussions and enabling local communities to better mitigate, prepare, and adapt to changes caused by OA.

OAP was established according to section 12406 of the 2009 Federal Ocean Acidification Research and Monitoring Act (FOARAM) to fund, oversee and coordinate research, monitoring, and other activities consistent with the Strategic Plan for Federal Research and Monitoring of Ocean Acidification developed by the interagency working group on ocean acidification (OA). OAP is also responsive to additional requirements introduced in the Magnuson Stevens Reauthorization Act.

OAP administers a multi-disciplinary, matrixed program, coordinating OA activities NOAA-wide. To achieve FOARAM Act requirements, the OAP:

1. Promotes the development of an ocean, coral reef, and coastal OA monitoring network comprised of targeted geochemical/ecological synoptic surveys, fixed time-series stations, and autonomous underway observations.
2. Funds a range of experimental studies examining the sensitivity of commercially important living marine resources under NOAA's purview to OA.
3. Promotes the development of forecasting models of ecosystem and socioeconomic impacts
4. Invests in critical new technologies that can facilitate geochemical and ecosystem monitoring.
5. Conducts outreach and education to explain ocean acidification and its potential impacts on ecosystems and society.
6. Supports research to identify and develop adaptation strategies for impacted communities.

The value of ocean acidification research is already evident in the Pacific Northwest where oyster hatcheries on the verge of collapse just a few years ago are again major contributors to the \$111 million West Coast shellfish industry. A \$500,000 investment in monitoring coastal seawater, which enables hatchery managers to schedule production when water quality is good, is helping to restore commercial hatcheries and expected to reap an estimated \$35 million for coastal communities in Oregon and Washington. This example highlights the urgency of this problem and the value of ocean acidification research and monitoring.

Schedule and Milestones:

FY 2016 - 2020

- Deploy and maintain OA moorings
- Deploy and maintain coral reef monitoring sites
- Instrument and maintain OA sensors on NOAA Research and Volunteer Observing Ships
- Conduct Ocean Acidification coastal observing and process research cruises

- Complete single- and multi-species experiments
- Develop high-resolution physical-biogeochemical-ecosystem and socioeconomic regional models critical for developing adaptation strategies
- Develop coastal early-warning system that can identify episodic low pH events and alert managers of potentially impacted resources
- Development of data synthesis products responsive to stakeholder needs
- Conduct robust education and outreach activities in coordination with partners
- Develop curricula and outreach products and services including development of NOAA national OA web portal for access to information and data
- Partner with IOOS Marine Sensor Program to develop marine sensors that can assist coastal industries with both scientific and monitoring capacity
- Announce competitive RFPs for modeling, species impacts research, observing optimization studies, and synthesis product development in FY 2016
- Award competitive grants for species impacts, modeling, observing optimization and data synthesis product development in FY 2016
- Deploy observing assets, as identified through observing optimization process

Deliverables:

- Integrated assessments of the ecological and societal impacts of ocean acidification in each U.S. coastal region and the Great Lakes
- Improved public understanding of the threats of ocean acidification and the solutions to preserving the ocean and Great Lakes ecosystems
- Standardized chemical and biological monitoring protocols for the measurement of carbon dioxide system parameters and physiological effects on marine organisms
- Predictions of pH and carbonate saturation in the future ocean using global climate change model projections
- Regional biogeochemical and ecological models developed
- Decision support tools
- Educational and outreach products to increase the dialogue among scientists, policy-makers, teachers, and the public
- Optimized observing systems in each of the eight large marine ecosystem regions
- Seafood industries more resilient to ocean acidification impacts
- Operational regional ecosystem models

Performance Goals and Measurement Data:

Performance Measure:	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
Increase number of sites with <i>in situ</i> -based fixed platforms that are accurately measuring the carbon parameters needed to calculate mean annual Aragonite Saturation State determined to be within 0.2 units of the actual mean	15	15	15	17	17	17	17
Description: This measure represents an annual inventory of <i>in situ</i> -based fixed and underway observing platforms dedicated to monitoring the magnitude, and rate of biogeochemical changes in response to increasing atmospheric carbon dioxide.							

Performance Measure: Increase cumulative number of living marine resources characterized for vulnerability to ocean acidification	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	45	50	55	60	65	70	75
Description: Cumulative number of economically important species (or species on which those commercially important species rely) whose vulnerability to ocean acidification has been tested in NOAA or university laboratories.							

Performance Measure: Increase number of large marine ecosystem's (LME) provided coastal OA models and synthesis products and tools in support of stakeholder and management decisions (cumulative)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	0	0	0	4	6	8	8
Description: Number of regions provided OA models and/or synthesis products and tools. Regions are defined by NOAA's Regional Ecosystems and U.S. LMEs. Plans are to rotate the focus from LME to LME, although the targeted optimization studies and synthesis products will likely focus on subregions within the LMEs (distinct estuaries, marine protected areas, seamounts, river mouths within LMEs).							

Performance Measure: Expand number of coastal regions with completed observing system optimization studies (cumulative)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	0	0	0	2	6	9	10
Description: Cumulative number of completed regional analyses. Competitive studies will be initiated beginning in FY 2016 with final analysis of the initial regions anticipated in two years (FY 2018). Some regions are already being analyzed through an OAP/IOOS partnership (Northeast) and through NOAA/state partnerships (Pacific NW) so these can be completed sooner.							

Performance Measure: Increase number of industry partners provided scientific capacity through OA adaptation technologies and methods (cumulative)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	0	2	6	6	6	7	7
Description: Industry partners provided direct scientific and monitoring support to aid them in designing adaptive management technologies and strategies that promote resilience to enhanced coastal OA conditions.							

SUSTAINED OCEAN OBSERVATIONS AND MONITORING

OAR develops and sustains key components of the Global Ocean Observing System (GOOS). GOOS is a foundation for climate research and prediction as well as long-term monitoring for climate change detection and attribution. GOOS observations are used routinely for weather and ecosystems research, invaluable for weather and ocean predictions, and provide validation information for NOAA and NASA satellite products. Satellites are critical elements of this composite system, but are listed elsewhere in the NOAA and NASA budgets. All interdependent elements work together to provide the needed system.

NOAA provides the major U.S. contribution to the global component of the Integrated Ocean Observing System (IOOS), as codified in the Integrated Coastal and Ocean Observation System Act of 2009. All components of the global system require international partnerships and contributions. This observation system is based on measuring a set of core variables that have been agreed to internationally to provide the information needed by the U.S. and other nations to effectively plan for and manage their response to climate variability and change.

Major elements of GOOS that this program contributes to include:

- Argo Profiling Floats
- Surface Drifting Buoys
- Tide Gauge Stations
- Tropical Moored Buoys
- Ocean Reference Stations
- Ships of Opportunity
- Ocean Carbon Networks
- Dedicated Ships
- Data Management and Analysis

Deliverables:

- 9 ocean reference stations deployed
- 1000 drifting buoys deployed annually
- 320 Argo Array Buoys deployed annually
- 35 Tropical Moored Buoys installed
- 80 Tide Gauge Reference Stations
- 24 Ocean carbon surveys conducted
- 200 days dedicated ship support
- Integration of Deep Argo data into the Argo Data Management System

Performance Goals and Measurement Data:

Performance Measure: Error in global measurement of sea surface temperature (°C) (Measure 3.1g)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	0.63	0.59	0.50	0.50	0.50	0.50	0.50
Description: This measure is intended to document progress in accurately measuring the global sea surface temperature (SST) using <i>in situ</i> drifting buoys to verify that satellite SST data are accurate and representative. Success in this performance measure requires the maintenance and increase of <i>in situ</i> ocean sensors. The goal is to reach an indicator value of 0.3 degrees Celsius, which has been specified by the international GOOS as the required accuracy for measurement of sea surface temperature.							

Performance Measure: Improve percent reduction in the error of the observed estimates of ocean and meridional heat transport (AOML contribution)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	1.2%	1.6%	1.9%	2.2%	2.5%	2.8%	3.1%
Description: As a result of observations, research, and reports on the state of the ocean, heat storage, and meridional heat transport in the Atlantic Ocean, there will be increased knowledge for scientists creating modeled estimates of heat transport over time, leading to less uncertainty in those models.							

Performance Measure: Increase cumulative number of data collection platforms deployed by PMEL in support of the Global Ocean Observing System (GOOS)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	829	876	921	962	999	1032	1060
Description: This measure represents a significant portion of PMEL's contribution to GOOS. The measure identifies each Argo float deployed and each moored buoy from the PIRATA, RAMA, and ocean climate station programs as a unit; TAO is not included as it is maintained by the National Weather Service. Completion of GOOS is analogous to the global weather observing system since fully-implemented GOOS will provide ocean data that all nations can use to provide improved ocean-related analytical and predictive products (forecasts).							

PROGRAM CHANGES FOR 2016:

Ocean, Coastal and Great Lakes Laboratories and Cooperative Institutes: Base Research (Base Funding: \$29,546,000 and 132 FTE; Program Change: -\$531,000 and 0 FTE):

NOAA requests a decrease of \$531,000 and 0 FTE for a total of \$29,015,000 and 125 FTE to decrease Cooperative Institute (CI) support for planned research projects in FY 2016. NOAA will narrow the focus of funding for research, broadly spread across its Cooperative Institutes partners, to particular key areas in FY 2016 such as:

- Improved protection, restoration, and management of coastal and ocean resources;
- Monitoring of ocean, coastal, and Great Lakes ecosystems, including coral;
- Supporting ecosystem modeling and forecasting; and
- Encouraging technology transfer and efficient resource management.

NOAA will continue its traditional relationships with CIs in accomplishing the above objectives. Instead of having a dedicated pool of funding available for such efforts, NOAA research labs will continue to involve CI researchers using base resources. NOAA will make awards to CI's in those instances where they can make significant advances through such partnerships.

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: Office of Oceanic and Atmospheric Research
Sub-program: Ocean, Coastal and Great Lakes Research
Program Change: Base Research

Object Class		FY 2016 Decrease	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	0	\$7,734
11.3	Other than full-time permanent	0	580
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	0	8,314
12	Civilian personnel benefits	0	2515
13	Benefits for former personnel	0	19
21	Travel and transportation of persons	0	338
22	Transportation of things	0	218
23.1	Rental payments to GSA	0	155
23.2	Rental Payments to others	0	1560
23.3	Communications, utilities and miscellaneous charges	0	186
24	Printing and reproduction	0	34
25.1	Advisory and assistance services	0	7778
25.2	Other services	0	768
25.3	Purchases of goods & services from Gov't accounts	0	2,053
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	0
31	Equipment	0	467
32	Lands and structures	0	36
33	Investments and loans	0	0
41	Grants, subsidies and contributions	(531)	4,574
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	(531)	29,015

Ocean, Coastal and Great Lakes Research Laboratories and Cooperative Institutes: Autonomous Underwater Vehicle Demonstration (Base Funding: \$2,000,000 and 0 FTE; Program Change: -\$ 2,000,000 and 0 FTE): NOAA requests a decrease of \$2,000,000 and 0 FTE for a total of \$0 to eliminate support for an autonomous underwater vehicle (AUV) testbed.

Proposed Actions:

The AUV demonstration was established in 2014 and in 2015 a number of candidate vehicles and/or technologies will be procured for testing various instrument suites for on-going development/integration. With this reduction, the pace of evaluating new technologies for ocean observations will be slowed.

NOAA will maintain its fleet of autonomous vehicles and other alternative technologies, and will continue to support a Requests for Proposals (RFP) process open to NOAA Labs and Cooperative Institutes but will reduce the funding available for ongoing development, testing and evaluation activities. Innovative instrumentation will continue to be developed by NOAA and its partners, with testing and evaluations conducted in the marine environment with vessels of opportunity.

Resource Assessment:

Current resources are used to identify and provide an array of surface and subsurface autonomous vehicles and other appropriate technology to support ocean observations for NOAA use. AUV demonstration funding will cease in FY 2016.

Schedule and Milestones:

- Cease support for the AUV demonstration in FY 2016

Deliverables:

- Identify high priority technologies as candidate systems for development/ integration

Performance Goals and Measurement Data:

Performance Measure:	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
Identify high priority technologies as candidate systems for development/ integration. (annual)	Actual	Target	Target	Target	Target	Target	Target
With Decrease	N/A	N/A	2	2	2	2	2
Without Decrease	4	4	4	4	4	4	4

Performance Measure:	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
Demonstration/testing of new technologies (annual)	Actual	Target	Target	Target	Target	Target	Target
With Decrease	N/A	N/A	1	1	2	2	2
Without Decrease	0	0	2	3	4	4	4

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: Office of Oceanic and Atmospheric Research
Sub-program: Ocean, Coastal, and Great Lakes Research
Program Change: AUV Demonstration

Object Class	FY 2016 Decrease	FY 2016 Total Program
11 Personnel compensation		
11.1 Full-time permanent	\$0	\$0
11.3 Other than full-time permanent	0	0
11.5 Other personnel compensation	0	0
11.8 Special personnel services payments	0	0
11.9 Total personnel compensation	0	0
12 Civilian personnel benefits	0	0
13 Benefits for former personnel	0	0
21 Travel and transportation of persons	0	0
22 Transportation of things	0	0
23.1 Rental payments to GSA	0	0
23.2 Rental Payments to others	0	0
23.3 Communications, utilities and miscellaneous charges	0	0
24 Printing and reproduction	0	0
25.1 Advisory and assistance services	0	0
25.2 Other services	-	-
25.3 Purchases of goods & services from Gov't accounts	0	0
25.4 Operation and maintenance of facilities	0	0
25.5 Research and development contracts	0	0
25.6 Medical care	0	0
25.7 Operation and maintenance of equipment	0	0
25.8 Subsistence and support of persons	0	0
26 Supplies and materials	0	0
31 Equipment	(1,800)	(1,800)
32 Lands and structures	0	0
33 Investments and loans	0	0
41 Grants, subsidies and contributions	-200	-200
42 Insurance claims and indemnities	0	0
43 Interest and dividends	0	0
44 Refunds	0	0
99 Total obligations	(2,000)	(2,000)

National Sea Grant College Program Base: National Sea Grant College Program (Base Funding: \$62,883,000 and 13 FTE; Program Change: -\$ 1,431,000 and 0 FTE): NOAA requests a decrease of \$ 1,431,000 and 0 FTE for a total of \$ 61,452,000 and 13 FTE to reduce funding for research.

Proposed Actions:

NOAA Sea Grant will decrease the amount of research funding available for competitively awarded projects. Sea Grant funds competitive grant competitions through its network of 33 Sea Grant Colleges. Sea Grant is a leader in local and regional approaches to understand and maintain healthy ecosystems, with planning efforts across the country that identify information gaps, implement research priorities, and coordinate information and technology transfer to people who need it. Sea Grant also uses its unique research and outreach capabilities to assist coastal communities in balancing the multiple demands on their coastal resources and responding to and mitigating natural and technological hazards and the demands of an increasing coastal population.

Resource Assessment:

Resources for this activity are described in the National Sea Grant College Program narrative.

Schedule and Milestones:

FY 2016 - 2020

- Create or retain over 53,090 jobs as a result of Sea Grant research and outreach in renewable energy, aquaculture, biotechnology, and other emerging industries

Deliverables:

- Create and transfer at least 175 decision-support tools/technologies to coastal managers per year

Performance Goals and Measurement Data:

Performance Measure:	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
Annual economic and societal benefits derived from Sea Grant activities							
With Decrease:							
Jobs created/retained	N/A	N/A	9,445	9,445	9,445	9,445	9,445
Businesses created/retained	N/A	N/A	1,965	1,965	1,965	1,965	1,965
Economic benefit (millions of dollars)	N/A	N/A	\$315	\$315	\$315	\$315	\$315
Without Decrease:							
Jobs created/retained	9,600	9,600	9,600	9,600	9,600	9,600	9,600

Businesses created/retained	2,000	2,000	2,000	2,000	2,000	2,000	2,000
Economic benefit (millions of dollars)	\$320	\$320	\$320	\$320	\$320	\$320	\$320
Description: Society benefits from Sea Grant's assistance in developing new businesses/jobs and retaining existing businesses/jobs. This measure also tracks economic (market and non-market) benefits from the development of new ocean, coastal, and Great Lakes resources and technology.							

Performance Measure: Cumulative number of tools, technologies, and information services that are used by NOAA partners/customers to improve ecosystem-based management (2010 baseline)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Decrease	N/A	N/A	2,775	3,220	3,660	4,090	4,520
Without Decrease	1820	2,320	2,820	3,320	3,820	4,320	4,820
Description: This measure tracks success in translating research findings into tools, technologies and information services that improve the use and management of coastal, ocean, and Great Lakes ecosystems. Examples of tools include: land cover data, benthic habitat maps, and environmental sensitivity index maps. Technologies refer to the transfer of new or underused approaches for addressing coastal management (e.g., remote sensing, biosensors, autonomous underwater vehicles, genetic markers for fishery stocks) and resource development (e.g., culture systems for aquaculture, marine pharmaceuticals). This includes the application of technology to coastal resource management through synthesis, integration, training, and the development of new management tools.							

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Program: Office of Oceanic and Atmospheric Research
Sub-program: Ocean, Coastal, and Great Lakes Research
Program Change: National Sea Grant College Program

Object Class		FY 2016 Decrease	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$1,088
11.3	Other than full-time permanent	0	86
11.5	Other personnel compensation	0	
11.8	Special personnel services payments	0	
11.9	Total personnel compensation	0	1,174
12	Civilian personnel benefits	0	348
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	107
22	Transportation of things	0	500
23.1	Rental payments to GSA	0	263
23.2	Rental Payments to others	0	1000
23.3	Communications, utilities and miscellaneous charges	0	0
24	Printing and reproduction	0	724
25.1	Advisory and assistance services	0	0
25.2	Other services	0	0
25.3	Purchases of goods & services from Gov't accounts	0	1,465
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	0
31	Equipment	0	0
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	(1,431)	55,871
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	(1,431)	61,452

Marine Aquaculture Program: Marine Aquaculture: (Base Funding \$4,500,000 and 1 FTE; Program Change +\$2,500,000 and 0 FTE). NOAA requests an increase of \$ 2,500,000 and 0 FTE for a total of \$ 7,000,000 and 1 FTE to provide competitive grants to support aquaculture research, extension activities, and technology transfer to develop a sustainable aquaculture industry.

Proposed Actions:

This funding will restore and enhance the National Sea Grant College Program's Marine Aquaculture Program, which provides competitive grants that increase environmental intelligence. These grants support the aquaculture industry, state Sea Grant programs, and academic partners.

The FY 2016 requested funding will be used to develop and transfer new and improved technologies; improve aquaculture practices; and fund aquaculture-related extension activities that contribute to both economic and environmental community resilience. This initiative dovetails with another FY 2016 NOAA initiative, which requests funding for National Marine Fisheries Service science centers to focus on developing "tools for rules" to facilitate efficient and effective permitting. The increase to the National Sea Grant College Program's Marine Aquaculture Program will provide funds to Sea Grant's National Aquaculture Competition to focus on generating scientific knowledge for industry development, producing innovative university research, and providing extension/tool and technology transfer to support sustainable domestic aquaculture.

Statement of Need and Economic Benefits:

Domestic marine aquaculture is poised to emerge as a significant provider of seafood and coastal jobs over the next several years. Several factors justify why NOAA should increase investment in aquaculture activities beginning in FY 2016:

- Industry leaders (e.g., the newly formed Coalition for U.S. Seafood Production) are calling for government assistance to support domestic marine aquaculture production now that seafood prices have reached all-time highs, global demand for seafood products is rapidly increasing, and the U.S. is now importing over 90 percent of its seafood.
- Swelling of support by the public and popular press for domestic seafood driven by a growing local food (or 'locavore') movement. Knowledge of and demand for sustainable practices in aquaculture to provide domestically sourced seafood is also growing.
- Currently there are no commercial operations in Federal waters, but that will soon change as a 2009 fishery management plan (FMP) authorizes NOAA to issue aquaculture permits in Federal waters of the Gulf of Mexico for the first time. NOAA permitting for aquaculture in Federal (offshore) waters is planned to be implemented as early as 2015.

Without the aquaculture increases requested for NOAA, there is a significant risk that aquaculture companies will continue to avoid investing in the U.S. in favor of other nations (e.g., Panama, Mexico, and Canada) that have recognized aquaculture's contribution to the seafood supply of coastal economies. Seafood industry leaders and the public are encouraging NOAA to increase investment in domestic aquaculture. Without additional funding, there is risk that the Department of Commerce will lose a significant opportunity to develop a robust, domestic, sustainable aquaculture industry.

Resource Assessment:

The National Sea Grant Marine Aquaculture Program supports aquaculture research and extension at state Sea Grant programs as well as supporting the National Sea Grant Marine Aquaculture Grant Program. Currently, this competitive grant program is the only U.S. government grant program dedicated to supporting marine aquaculture development, and is strongly supported by industry and academic partners. These grants support technology development and transfer, demonstration projects, and applied research that supports NOAA's regulatory mission, all targeted at the

development of sustainable marine aquaculture. Examples include reducing the amount of fishmeal and fish oil in aquaculture feeds, data and models to assist the siting of new or expanded aquaculture farms, developing rapid assessment technology to quantify pathogens to increase seafood safety and quality, diversifying aquaculture species, and products to foster economic resilience. When called upon to issue aquaculture permits, NOAA will need research that exceeds the capability of the current intramural science at NOAA.

Schedule and Milestones:

FY 2016 - 2020

- Increase the number of decision-support tools/technologies created and transferred to coastal managers for use in decision making from 250 per year to 350 per year in FY 2016 and beyond
- Extension activities and technology transfer specifically designed to support development of the aquaculture industry

Deliverables:

- Increased amount of domestically produced safe sustainable seafood through increased marine aquaculture production - an estimated 30,000 metric tons increase
- Tens of thousands of jobs created mainly in coastal communities
- Increased number of industry development grants to external partners
- Implementation of new approaches to seafood production that benefits from Sea Grant research and extension on integrated multi-trophic aquaculture
- Development and transfer of at least 350 decision-support tools/technologies to coastal managers per year
- Training of more than 3,100 seafood processors in Hazard Analysis Critical Control Point per year

Performance Goals and Measurement Data

Performance Measure:	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
Increase number of tools, technologies, and information services that are used by NOAA partners/customers to improve aquaculture production							
With increase	N/A	N/A	30	30	30	30	30
Without increase	10	10	10	10	10	10	10
Description: This measure tracks success in translating research findings into tools, technologies and information services that improve aquaculture production. Examples of tools include: economic and environmental models. Technologies refer to the transfer of new approaches to mitigation of environmental effects, fingerling production, nutrition, and culture systems for aquaculture.							

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: Office of Oceanic and Atmospheric Research
Sub-program: Ocean, Coastal and Great Lakes Research
Program Change: Marine Aquaculture

Object Class		FY 2016 Increase	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	0	\$0
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	<u>0</u>	<u>0</u>
12	Civilian personnel benefits	0	0
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	0
22	Transportation of things	0	0
23.1	Rental payments to GSA	0	0
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and miscellaneous charges	0	0
24	Printing and reproduction	0	0
25.1	Advisory and assistance services	0	0
25.2	Other services	0	0
25.3	Purchases of goods & services from Gov't accounts	0	0
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	0
31	Equipment	0	0
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	2,500	7,000
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	<u>2,500</u>	<u>7,000</u>

National Sea Grant College Program Base: STEM Education (Base Funding: \$62,883,000 and 13 FTE; Program Change: \$0 and 0 FTE): NOAA requests a decrease of \$0 and 0 FTE to terminate Sea Grant STEM education activities at NOAA which is part of the Administration's reorganization of STEM education. The Sea Grant STEM Education activities funding will be reinvested within the National Sea Grant Program.

Proposed Actions:

As part of the Administration's comprehensive reorganization of STEM education programs to increase the impact of Federal investments, NOAA proposes to terminate funding NOAA Sea Grant STEM education activities. This funding will be reinvested in NOAA's National Sea Grant College Program.

In 2014, the President's Budget proposed a government-wide STEM reorganization to create a coherent framework for delivering STEM education to more students and more teachers more effectively while reducing fragmentation and the Administration published a Five-Year Federal Strategic Plan on STEM Education to help align the reorganization with key goals and strategies. The areas of priority for this plan include: improving pre-kindergarten-through-grade-twelve (pre-K-12) instruction; increasing and sustaining youth and public engagement with STEM; enhancing undergraduate STEM education; creating a national strategy around graduate fellowships; and better serving groups historically underrepresented in STEM.

Therefore, in accordance with the Administration's STEM education initiative, NOAA proposes to terminate STEM education programs within Sea Grant, including the following programs:

- All state Sea Grant Program STEM activities, such as K-12 teacher training, curricula development, and education
- Sea Grant/National Marine Fisheries Service (NMFS) Graduate Fellowship Program

Over the past two years, agencies have made considerable progress towards a stronger and more cohesive infrastructure for delivering STEM education. For example, in implementing the Strategic Plan, mission agencies have increased coordination with the lead agencies (the Department of Education, the National Science Foundation, and the Smithsonian Institution) and are identifying ways to leverage existing resources to improve the reach of agency assets.

The 2016 Budget builds on these efforts by proposing a fresh reorganization with targeted adjustments to enable more strategic investment in STEM education with a focus on building and using evidence-based practices and finding new models for leveraging assets and expertise.

Integrated Ocean Acidification: Integrated Ocean Acidification (Base Funding: \$8,583,000 and 4 FTE; Program Change: +\$ 21,422,000 and + 4 FTE): NOAA requests an increase of \$28,124,000 and 4 FTE for a total of \$30,005,000 and 16 FTE to improve understanding of ocean and enhanced coastal acidification (OA) and its impacts on marine resources and coastal communities and economies

Proposed Actions:

The proposed investment will enable NOAA to better inform national and regional stakeholders about the consequences of OA for water quality and ecosystem resilience, allowing coastal resource managers to employ adaptive strategies and policies. This proposed increase will also enable NOAA to lead national and international coordination efforts necessary to achieve maximum leverage and cost efficiency, including the establishment of a National Ocean Acidification Information Exchange as mandated in the Federal Ocean Acidification Research and Monitoring Act (FOARAM) and called for under a recent Government Accountability Office review.

Additional resources will support the following critical activities:

NOAA will support development of advanced technologies for cost effective, routine, *in situ* observing of both chemical and ecological indices in partnership with the Integrated Ocean Observing System (IOOS). NOAA will establish regional test-beds to develop and evaluate new technologies prior to operational deployment as part of the IOOS system. The ultimate goal of these studies is an integrated, multi-platform observing enterprise, which tracks carbon cycle dynamics and the associated ecosystem response, as well as determine long-term trends of OA in response to global change. This system will also incorporate the requirements of the National Coral Reef Monitoring Plan, in partnership with the NOAA Coral Reef Conservation Program. In order to realize the goal of an enhanced U.S. Ocean Acidification observing system, data access and management must also be expanded to accommodate the growth of this system.

Regional Vulnerability Assessments

The optimization studies, enhanced observational system, and modeling efforts described above will support the development of OA vulnerability assessments in order to determine where ecological and societal vulnerabilities exist or are emerging. These assessments will be used to prioritize impacts research, develop adaptation strategies, and communicate potential consequences of OA to stakeholders, policy makers and the public. Using both intramural expertise and competitively awarded extramural partnerships, NOAA will develop regional OA vulnerability assessments, starting with regions where OA impact concerns have already been established, such as the Pacific Northwest. Vulnerability assessments will involve both natural and social science approaches.

Scientific Capacity Building and Development of Adaptation Strategies for Impacted Industries and Other Stakeholders

Industries dependent on living marine resources are growing increasingly concerned about potential impacts of OA on marine species and habitats and the social and economic consequences of resource declines. Adaptation strategies will be developed according to the following approach:

- With increased resources NOAA OAP, together with the IOOS Marine Sensor Program, will promote OA R&D to improve science and monitoring that supports living-marine-resource industries and other stakeholders, such as coral reef managers and tribal communities.
- In order to assure applied relevance to users, this increase will expand laboratory and field research on the biological impacts of OA on targeted commercial and recreational fishery species (e.g., lobster), the prey species they rely on (e.g., krill), and important marine habitats (e.g, seagrass meadows, oyster beds, coral reefs) both within the NMFS fisheries science center experimental facilities and through extramural research grants to academic partners.

- Finally, NOAA OAP will work with partners to develop and test innovative adaptation strategies, through intramural and competitive awards, to provide stakeholders with the most viable options and evaluate local environmental impacts where appropriate.

Regional Ocean Acidification Models and Early Warning Systems

NOAA will develop enhanced, regionally focused, linked biogeochemical and ecosystem models optimized for characterizing OA dynamics and impacts to living marine resources and ecosystems. These models will provide information for managers, including how nutrient or local atmospheric input affects local acidification, how changes in carbonate chemistry affects the species and ecosystems and how future emission and local policy decisions will alter these systems in the future. Early warning systems for acute acidification episodes, such as those in upwelling systems, will be developed for certain vulnerable regions.

Regional Ocean Acidification Visualization and Synthesis Products

NOAA will develop products specific to user needs that will integrate OA knowledge and clearly communicate how OA is affecting U.S. waters and living marine resources. Products will include 1) visualizations and syntheses of changing ocean water chemistry at global, regional, and local scales, with an emphasis on high priority regions; 2) short- and long-term forecasts (e.g. early warnings for shellfish growers) of a range of OA parameters; and 3) visualizations and synthesis pertinent to coastal resources (e.g., fisheries, protected areas, coral reefs) potentially at risk by OA, including maps of socioeconomic vulnerability. These products will be developed in close coordination with regional stakeholder communities and academic partners, partly through competitive awards.

Establish the National Ocean Acidification Information Exchange

The FOARAM Act of 2009 required the establishment of an information exchange for sharing OA information and data generated through national investments. The General Accountability Office 2014 report on Federal implementation of FOARAM highlighted the continuing lack of an information exchange as a deficiency in the implementation of the Act. Effective information exchange will lead to greater coordination between all entities involved in OA research, monitoring, and adaptation in the United States. The established National OA Information Exchange will serve as the coordination nexus between Federal agencies, state agencies, academia, NGOs, foundations, impacted industries, coastal resource managers, and the public. It will be awarded through a competitive process.

Statement of Need and Economic Benefits:

Global ocean chemistry is changing at a rate at least ten times faster than at any time over the past 50 million years in response to rising atmospheric carbon dioxide concentrations.¹⁹ This ocean acidification (OA) has been associated with changes in a broad range of processes in marine species, including shell formation, survival and growth of young marine organisms and behavior. Coastal phenomena such as upwelling, riverine discharge, nutrient loading, and hypoxia can enhance OA at regional and local scales. In 2009, U.S. shellfish represented about half the total seafood revenue estimated at \$3.9 billion.²⁰ In Washington State alone, the shellfish industry generates \$270 million annually, and directly and indirectly supports 3200 jobs. Recreational oyster and clam harvesters contribute more than \$27 million annually to coastal economies.²¹ Coral reefs

¹⁹ Honisch, B. et al. 2012. The Geological Record of Ocean Acidification. *Science*. Vol 335: p1058-1063.

²⁰ U.S. summary data (page 7) of the [2009 NMFS Fisheries Economics report](#).

²¹ Washington Shellfish Initiative white paper, December 2011,

http://www.mypugetsound.net/index.php?option=com_docman&task=doc_view&qid=589&Itemid=238; Washington State Blue Ribbon Panel on Ocean Acidification. 2012. [Ocean Acidification: From Knowledge to Action \(Washington State's Strategic Response\)](#). p. xv. <https://fortress.wa.gov/ecy/publications/publications/1201015.pdf/>.

also provide \$30 billion in ecosystem services to local communities.²² It has been determined through research that ocean acidification is already having a negative impact on coral reefs and shellfish causing marine resource managers (including industry owners) to request enhanced information on how to adapt to the changing conditions. NOAA's scientific contributions to oyster hatcheries in Washington and Oregon have already helped reverse the financial losses. To more effectively respond to and mitigate the impacts of OA, we need to improve our understanding of OA and the impacts to valuable coastal marine resources. NOAA also needs to develop tools and adaptive strategies for affected industries and stakeholders.

Resource Assessment:

Resources for this program can be found in the Ocean, Coastal and Great Lakes narrative.

Schedule and Milestones:

FY 2016

- Announce competitive RFPs for technology and synthesis product development. Leveraged partnerships with other NOAA divisions will be used whenever possible
- Solicit community input to inform guidelines for the vulnerability assessment, observing optimization processes, and development of adaptation strategies
- Solicit community input to inform structure and function of the Information Exchange
- Award competitive grants for species impacts and regional OA forecast model development
- Three more sites provided *in situ* observing capacity, as well as expansion of observing capacity (surface and subsurface sensors) for at least three existing sites
- Expand capacity for OA data discovery in National Oceanographic Data Center

FY 2017

- Announce competitive RFPs and make first awards for first four regions to conduct vulnerability assessments and observing optimization and develop new adaptation strategies
- Announce competitive RFP and make first five-year award for establishment of the Information Exchange
- Announce competitive RFPs for modeling, species impacts research, technology, and synthesis product development. New technologies for use by impacted industries begin transfer to commercial production
- Three more sites provided *in situ* observing capacity as well as expansion of observing capacity (surface and subsurface sensors) for at least three existing sites
- Expand capacity for OA data discovery in National Oceanographic Data Center

FY 2018

- Announce competitive RFPs to conduct vulnerability assessments and observing optimization and develop adaptation strategies in five more regions
- Release initial data synthesis and visualization products in pilot region
- Three more sites provided *in situ* observing capacity, and observing capacity (surface and subsurface sensors) expanded for at least three existing sites

FY 2019

- Three more sites provided *in situ* observing capacity as well as expansion of observing capacity (surface and subsurface sensors) for at least three existing sites

²² Cesar, H., L. Burke, and L. Pet-Soede. 2003. The Economics of Worldwide Coral Reef Degradation. Cesar Environmental Economics Consulting (CEEC), 6828GH Arnhem, The Netherlands, 23 pp.

- Biogeochemical/ecosystem impacts models developed for at least four coastal regions, and initial projections of potential future chemistry and ecosystem conditions under OA released
- Release data synthesis and visualization products in four more regions

FY 2020

- Complete observing optimization and vulnerability assessments for 4 regions (total of nine high priority regions)
- Three more sites provided *in situ* observing capacity as well as expansion of observing capacity (surface and subsurface sensors) for at least three existing sites
- Vulnerability assessments used to guide species impacts research
- Biogeochemical/ecosystem impacts models developed for at least four additional coastal regions, and projections of potential future chemistry and ecosystem conditions under OA released to coastal managers in at least four coastal regions
- Four more industry and/or other coastal stakeholders provided OA observing technologies to inform adaptation strategies
- Novel adaptation strategies tested in at least two regions

Deliverables:

- Optimized and expanded observing system in 9 coastal regions or subregions designed to make observing data collection more effective and efficient
- Vulnerability assessments in 9 coastal regions or subregions which will define where ecological and societal vulnerabilities exist and where adaptation strategies must be developed
- Initial adaptation strategies tested and applied in several regions
- Regional biogeochemical and ecosystem models useful for projecting the impacts of OA on living marine resources and their ecosystems and informing management decisions from fisheries to anthropogenic inputs that enhance local acidification
- Readily available data products, which raise the visibility of ocean acidification and provide actionable information to policymakers and coastal managers
- Seafood industries, coastal ecosystems, and human communities more resilient to ocean acidification impacts

Performance Goals and Measurement Data:

Performance Measure:	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
Number of coastal regions with completed observing system optimization studies (cumulative)							
With Increase	N/A	N/A	0	0	0	4	4
Without Increase	0	0	0	0	0	0	0
Description: Cumulative number of completed regional analyses. Competitive studies will be initiated beginning in FY 2016 with final analysis of the initial regions anticipated in two years (FY 2018). Some regions are already being analyzed through an OAP/IOOS partnership (Northeast) and through NOAA/state partnerships (Pacific NW), so these may be completed sooner. Coral reef ecosystems are a high priority.							

Performance Measure: Number of industry partners provided scientific capacity through OA adaptation technologies and methods (cumulative)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	8	9	12	18	19
Without Increase	1	4	8	9	9	10	10
Description: Industry partners provided direct scientific and monitoring support to aid them in designing adaptive management technologies and strategies that promote resilience to enhanced coastal OA conditions.							

Performance Measure: Number of large marine ecosystem (LME) provided coastal OA models and synthesis products and tools in support of stakeholder and management decisions (cumulative)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	0	4	10	16	16
Without Increase	0	0	0	4	6	8	8
Description: Number of regions provided OA models and/or synthesis products and tools. Regions are defined by NOAA's Regional Ecosystems and U.S. LMEs. Although we plan to rotate the focus from LME to LME, the targeted optimization studies and synthesis products will likely focus on "hot spot" subregions within the LMEs (distinct estuaries or coral reefs, marine protected areas, seamounts, river mouths within LMEs) and then expanded out overtime.							

Performance Measure: Cumulative number of living marine resources characterized for vulnerability to ocean acidification	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	66	80	95	110	125
Without Increase	45	52	66	73	80	87	94
Description: Cumulative number of economically important species (or species on which those commercially important species rely) whose vulnerability to ocean acidification has been tested in NOAA or university laboratories. Additional funding will support research on more species and in-depth studies on species that warrant extensive examination.							

Performance Measure: Number of sites with <i>in situ</i> -based fixed and underway platforms that are accurately measuring the carbon parameters needed to calculate mean annual Aragonite Saturation State determined to be within 0.2 units of the actual mean	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	21	24	27	30	33
Without Increase	15	18	19	20	20	20	20
Description: This measure represents an annual inventory of <i>in situ</i> -based fixed and underway observing platforms dedicated to monitoring the magnitude, and rate of biogeochemical changes in response to increasing atmospheric carbon dioxide. Monitoring sites will be located in ecologically and economically important marine ecosystems, especially coral reefs in coordination with the Coral Reef Conservation Program. These ocean acidification observing platforms are defined by their inherent ability to fully constrain the carbonic acid system, as well as observing biological change, and must be capable of resolving decadal changes in ocean chemistry in response to ocean acidification. The data provided will be used by Federal and state regulatory agencies and commercial fisheries organizations and will contribute to and comply with the Global OA Observing Network.							

PROGRAM CHANGE PERSONNEL DETAIL

Program: Office of Oceanic and Atmospheric Research
Sub-program: Ocean, Coastal, and Great Lakes Research
Program Change: Integrated Ocean Acidification

Title:	Location	Grade	Number of Positions	Annual Salary	Total Salaries
Physical Scientist	Silver Spring, MD	ZP-III/IV	1	63,091	63,091
Physical Scientist	Silver Spring, MD	ZP-V	1	124,995	124,995
Physical Scientist	FLEXIBLE	ZP-IV	2	89,924	179,848
Administration	Silver Spring, MD	ZA- III/IV	2	63,091	126,182
Subtotal			<u>6</u>		<u>\$494,116</u>
Less Lapse	25%		<u>(2)</u>		<u>(\$123,529)</u>
Total Full-time permanent:			4		\$370,587
2016 Pay Adjustment	1.3%				\$4,817
TOTAL			4		\$375,404
Personnel Data			Number		
Full-time Equivalent Employment					
Full-time permanent			4		
Other than full-time permanent			0		
Total			<u>4</u>		
Authorized Positions:					
Full-time permanent			6		
Other than full-time permanent			0		
Total			<u>6</u>		

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: Office of Oceanic and Atmospheric Research
Sub-program: Ocean, Coastal, and Great Lakes Research
Program Change: Integrated Ocean Acidification

Object Class	FY 2016 Increase	FY 2016 Total Program
11 Personnel compensation		
11.1 Full-time permanent	\$372	\$1,072
11.3 Other than full-time permanent	0	0
11.5 Other personnel compensation	0	0
11.8 Special personnel services payments	0	0
11.9 Total personnel compensation	372	1,072
12 Civilian personnel benefits	82	236
13 Benefits for former personnel	0	0
21 Travel and transportation of persons	89	315
22 Transportation of things	100	253
23.1 Rental payments to GSA	636	939
23.2 Rental Payments to others	0	21
23.3 Communications, utilities and miscellaneous charges	0	15
24 Printing and reproduction	10	23
25.1 Advisory and assistance services	0	51
25.2 Other services	0	83
25.3 Purchases of goods & services from Gov't accounts	984	2,471
25.4 Operation and maintenance of facilities	400	609
25.5 Research and development contracts	0	0
25.6 Medical care	0	0
25.7 Operation and maintenance of equipment	4,500	5,500
25.8 Subsistence and support of persons	0	0
26 Supplies and materials	1,500	2,451
31 Equipment	3,750	4,784
32 Lands and structures	0	0
33 Investments and loans	0	0
41 Grants, subsidies and contributions	8,999	11,182
42 Insurance claims and indemnities	0	0
43 Interest and dividends	0	0
44 Refunds	0	0
99 Total obligations	21,422	30,005

Ocean Exploration and Research: Ocean Exploration (Base Funding: \$28,000,000 and 19 FTE; Program Change: -\$ 8,780,000 and 0 FTE): NOAA requests a decrease of \$ 8,780,000 and 0 FTE for a total of \$19,344,000 and 19 FTE to reduce mapping and exploration of unknown and poorly known ocean areas and phenomena.

Proposed Actions:

With this decrease the Ocean Exploration and Research (OER) Program will reduce the number of days for the Extended Continental Shelf (ECS) mapping effort, which is a high-level, interagency, multi-year effort to define the potential extension of the U.S. continental shelf under international law. In addition, this reduction will decrease the number of exploration missions conducted aboard the NOAA vessel *Okeanos Explorer* and Ocean Exploration Trust operated *E/V Nautilus*. Finally, OER will eliminate support for interagency biodiversity observation network funding and will decrease support for extramural grants.

Resource Assessment:

Current resources for this activity are described in the Ocean, Coastal and Great Lakes Research narrative.

Schedule and Milestones:

FY 2016 - 2020

- Conduct one interagency partnership (i.e., BOEM, National Science Foundation) expeditions per year to explore and characterize habitats and ecosystems in deep water areas
- Acquire limited amount of Days-At-Sea on UNOLS, Navy, NOAA and other vessels to accelerate and complete the baseline mapping of the potential ECS

Deliverables:

- One ECS expedition to map and characterize the potential ECS in the central and western Pacific, Arctic, Gulf of Alaska, and the western Atlantic
- One BOEM-NOAA partnership expedition to explore and characterize habitats and ecosystems in deep water areas in the Mid-Atlantic Bight and expand this highly leveraged NOPP sanctioned partnership into the Arctic and other EEZ regions, generating maps, peer-review journal reports, and other products
- Autonomous Underwater Vehicle (AUV) mapping and habitat characterization surveys generating maps and databases containing information on environmental and oceanographic conditions in the areas surveyed

Performance Goals and Measurement Data:

Performance Measure:	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
Annual number of coastal, marine and Great Lakes ecological characterizations that meet management needs (Measure 18a, OER contribution only – number of expeditions per year)							
With Decrease	N/A	N/A	1	1	1	1	1
Without Decrease	2	2	2	2	2	2	2

Description: Conduct joint expeditions with DOI's BOEM, USGS and other partners to explore and characterize habitats and ecosystems in deep water areas of the Gulf of Mexico, the Mid-Atlantic Bight, the Arctic, and other high priority areas.

Performance Measure: Annual number of coastal, marine and Great Lakes ecological characterizations that meet management needs (Measure 18a. OER contribution only – number of bathymetric expeditions per year)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Decrease	N/A	N/A	1	1	1	1	1
Without Decrease	2	2	2	2	2	2	2

Description: The Extended Continental Shelf mapping (ECS) effort is a high-level interagency multi-year effort to define the potential extension of the U.S. continental shelf under international law. Conduct mapping and ecosystem surveys per ECS task force directives. The ECS bathymetric mapping effort is expected to conclude by 2017. Within NOAA, OER intends to use this information strategically to make informed decisions regarding comprehensive exploration and research.

Performance Measure: Annual number of coastal, marine and Great Lakes ecological characterizations that meet management needs (Measure 18a, OER contribution only – number of interdisciplinary expeditions per year)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Decrease	N/A	N/A	1	1	1	1	1
Without Decrease	3	3	3	3	3	3	3

Description: The ECS effort is a high-level interagency multi-year effort to define the potential extension of the U.S. continental shelf under international law. Using the information collected during previous bathymetric mapping cruises, identify high-priority areas that may contain unique and vulnerable habitats and/or marine resources, and conduct interdisciplinary exploration expeditions to establish baseline characterizations.

Performance Measure: Number of tools, technologies, and information services that are used by NOAA partners/customers to improve ecosystem-based management (OER contribution to Measure 3.3e)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Decrease	N/A	4	1	1	1	1	1
Without Decrease	3	4	4	4	4	4	4
Description: Work towards this performance measure represents the cumulative number of projects OER partners/customers that use the cutting edge exploration technologies mission systems on the NOAA Ship <i>Okeanos Explorer</i> and associated shore-based network, as well as the data collection, processing and dissemination tools.							

Performance Measure: Annually prepare engagement products expressly tied to OER's mission for use by a diversity of stakeholders and audiences to enhance ocean science literacy	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Decrease	N/A	9	6	6	6	6	6
Without Decrease	8	9	9	9	9	9	9
Description: The goal of OER's engagement strategy and products is to increase access to, understanding of, and appreciation for systematic deep-ocean exploration and its importance in forming the baseline for ocean research, management, and policy decisions							

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Program: Office of Oceanic and Atmospheric Research
Sub-program: Ocean, Coastal, and Great Lakes Research
Program Change: Ocean Exploration

Object Class		FY 2016 Decrease	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$2,837
11.3	Other than full-time permanent	0	369
11.5	Other personnel compensation	0	117
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	0	3,323
12	Civilian personnel benefits	0	801
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	(60)	252
22	Transportation of things	(40)	42
23.1	Rental payments to GSA	0	252
23.2	Rental Payments to others	0	49
23.3	Communications, utilities and miscellaneous charges	(400)	693
24	Printing and reproduction	0	18
25.1	Advisory and assistance services	(80)	1,725
25.2	Other services	(713)	0
25.3	Purchases of goods & services from Gov't accounts	0	2,494
25.4	Operation and maintenance of facilities	0	1,844
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	(200)	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	(300)	0
31	Equipment	(700)	0
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	(6,287)	7,850
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	1
44	Refunds	0	0
99	Total obligations	(8,780)	19,344

Ocean Exploration and Research: STEM Education (Base Funding: \$28,124,000 and 19 FTE; Program Change: \$0 and 0 FTE): NOAA requests a decrease of \$0 and 0 FTE to terminate Ocean Exploration and Research STEM education activities at NOAA which is part of the Administration's reorganization of STEM education. The Ocean Exploration and Research STEM education funding will be reinvested within the Ocean Exploration and Research Program.

Proposed Actions:

As part of the Administration's comprehensive reorganization of STEM education programs to increase the impact of Federal investments, NOAA proposes to terminate funding for Ocean Exploration and Research STEM education activities. This funding will be reinvested in NOAA's Ocean Exploration and Research program.

In 2014, the President's Budget proposed a government-wide STEM reorganization to create a coherent framework for delivering STEM education to more students and more teachers more effectively while reducing fragmentation, and the Administration published a Five-Year Federal Strategic Plan on STEM Education to help align the reorganization with key goals and strategies. The areas of priority for this plan include: improving pre-kindergarten-through-grade-twelve (pre-K-12) instruction; increasing and sustaining youth and public engagement with STEM; enhancing undergraduate STEM education; creating a national strategy around graduate fellowships; and better serving groups historically underrepresented in STEM.

Over the past two years, agencies have made considerable progress towards a stronger and more cohesive infrastructure for delivering STEM education. For example, in implementing the Strategic Plan, mission agencies have increased coordination with the lead agencies (the Department of Education, the National Science Foundation, and the Smithsonian Institution) and are identifying ways to leverage existing resources to improve the reach of agency assets.

The 2016 Budget builds on these efforts by proposing a fresh reorganization with targeted adjustments to enable more strategic investment in STEM education with a focus on building and using evidence-based practices and finding new models for leveraging assets and expertise.

Therefore, in accordance with the Administration's STEM education initiative, NOAA proposes to terminate STEM education programs within the Office of Ocean Exploration, including outreach and education programs.

APPROPRIATION ACCOUNT: OPERATIONS, RESEARCH, AND FACILITIES
SUB-PROGRAM: INNOVATIVE RESEARCH AND TECHNOLOGY

The objective of the Innovative Research and Technology sub-program is to accelerate the adoption of advanced computing, communications, and information technology throughout NOAA. Innovative Research and Technology supports OAR's High Performance Computing and Communications (HPCC) Initiative. The HPCC program supports OAR through major improvements in weather and climate forecasting, ecosystem and ocean modeling, and environmental information dissemination. Through this program, NOAA participates as a mission agency in the multi-agency Networking and Information Technology Research and Development (NITRD) program.

HIGH PERFORMANCE COMPUTING (HPCC) INITIATIVES

The purpose of the HPCC program is to improve the accuracy and timeliness of NOAA's short-term weather warnings, seasonal forecasts, hurricane forecast improvements, as well as regional and global climate predictions are heavily dependent on major advances. Timely and responsive dissemination of NOAA's services and information requires full use of modern network and communication technologies. The activities that are currently being conducted with program resources and how those resources are allocated are as follows:

<i>Activity</i>	<i>Dollars in Millions</i>	<i>FTE</i>
Program Management	\$1.3	6
HPCC R&D IT Proposals	\$1.1	1
Environmental Modeling Software Development	\$5.4	3
R&D HPC Contract	\$3.6	2
Acquisition Support	\$0.7	1

The HPCC program provides NOAA with necessary computational and network resources required to support continued advances in environmental modeling capabilities. Benefits of the HPCC program include:

- Improvements in short-term warning and weather forecast systems and models,
- Enabling scientists to attack long-lead time problems associated with the physical processes that govern the behavior of the atmosphere and ocean,
- Maintaining NOAA's leadership position in understanding climate with applications towards critical issues such as hurricanes, drought, sea-level rise, and
- Accelerating modeling and simulation activities and providing relevant decision support information on a timely basis for programs such as the multi-agency Climate Change Science Program.

Schedule and Milestones:

FY 2016 – 2020

- Annually fund approximately 11 HPC and advanced networking R&D projects

FY 2016

- Update Flow-following finite-volume Icosahedral Model global model and updates for operations
- Non-hydrostatic Icosahedral Model (NIM) configured with Weather Research and Forecasting (WRF) physics running completely on both conventional and fine-grained compute architectures

FY 2017

- Update Flow-following finite-volume Icosahedral Model global model and updates for operations
- Complete migration of at least one operational model and one research model to next-generation architecture software structure
- Model for Prediction across Scales (MPAS) or another non-hydrostatic global model (dependent on scientific and performance evaluation) running on the graphic processing unit (GPU) and many integrated core (MIC) processors

Deliverables:

- HPC System availability – Maximum number of computational hours made available to scientists

Performance Goals and Measurement Data:

Performance Measure: Maintain HPCC / R&D System Availability	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	99%	96%	96%	96%	96%	96%	96%
Description: The HPCC program provides NOAA researchers with a reliable computing resource that allows them to plan, with a high degree of confidence, their project milestones and deliverables. System outages can adversely affect NOAA initiatives such as meeting the Intergovernmental Panel on Climate Change milestones or cause delays in implementing operational improvements for hurricane track and intensity predictions. Ensuring high system availability enables NOAA to maximize its investment in these resources.							

Performance Measure: Continue software development projects completed for climate, weather and water environmental R&D (per year)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	5	8	8	8	8	8	8
Description: Each year the HPCC program funds software modeling development projects supporting NOAA’s environmental scientists. These models run on NOAA’s R&D supercomputers. These modeling efforts are focused on many different disciplines including climate change supporting the IPCC, hurricane forecast improvement, and advances in models supporting weather forecasting. Other OAR performance measures have direct dependencies on these modeling efforts.							

Performance Measure: Maintain number of R&D Information technology innovation projects initiated and completed. (per year)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	11	11	11	11	11	11	11
Description: Each year the HPCC program sponsors a program to promote innovation in information technology across all elements of NOAA supporting NOAA’s many missions. The goal in the program is identify promising new and innovative technologies or uses for existing technologies that can rapidly be adopted into operational settings supporting NOAA.							

Performance Measure: Identify Networking and Information Technology Research and Development (NITRD) interagency activities that NOAA actively participates in (per year)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	5	5	5	5	5	5	5
Description: NOAA has traditionally been an active participant in the White House Office of Science and Technology NITRD program. Funding from HPCC allows NOAA to participate in several NITRD interagency working groups including High End Computing, Human Computer Interaction and information management, Large Scale Networking, Software Design and Productivity.							

PROGRAM CHANGES FOR 2016:

High Performance Computing Initiatives: High Performance Computing Capacity (Base Funding: \$12,041,000 and 10 FTE; Program Change: \$103,000 and 0 FTE):

NOAA requests an increase of \$103,000 and 0 FTE for a total of \$12,144,000 and 10 FTE to accelerate the adoption of advanced computing, communications, and information technology throughout NOAA. With this increase, NOAA will continue to improve the accuracy and timeliness of NOAA's short-term weather warnings, seasonal forecasts, hurricane forecast improvements, through timely and responsive dissemination of NOAA's services and information using modern network and communication technologies.

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: Office of Oceanic and Atmospheric Research
Sub-program: Innovative Research & Technology
Program Change: High Performance Computing Capacity

Object Class		FY 2016 Decrease	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	0	\$1,337
11.3	Other than full-time permanent	0	1537
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	82
11.9	Total personnel compensation	<u>0</u>	<u>2,956</u>
12	Civilian personnel benefits	0	389
13	Benefits for former personnel	0	358
21	Travel and transportation of persons	0	0
22	Transportation of things	0	1,504
23.1	Rental payments to GSA	0	0
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and miscellaneous charges	0	0
24	Printing and reproduction	0	0
25.1	Advisory and assistance services	0	1,800
25.2	Other services	0	2,993
25.3	Purchases of goods & services from Gov't accounts	0	106
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	0
31	Equipment	103	248
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	1,790
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	<u>103</u>	<u>12,144</u>

**APPROPRIATION ACCOUNT: PROCUREMENT, ACQUISITION, AND CONSTRUCTION
SUB-PROGRAM: OAR SYSTEMS ACQUISITION**

Systems Acquisition provides sustained capability to the NOAA Research and Development (R&D) High Performance Computing System (HPCS) to advance climate science and accelerate the development of regional and sub-regional information products and services.

NOAA's R&D HPCS provides computational resources to support advances in environmental modeling crucial for understanding critical climate issues. This investment includes the supercomputing systems, associated storage devices, advanced data communications, hardware and software engineering services, security, and necessary data center space.

NOAA's R&D HPCS also provides software engineering support and associated tools to re-architect NOAA's applications to run efficiently on next generation fine-grain HPC architectures. Through a focused effort, engineers investigate and test new algorithms, train existing NOAA developers with new coding techniques, and assist these developers in accelerating the re-architecting of NOAA's applications. These software engineering efforts allow NOAA to take advantage of next-generation research computing technologies, but also help NOAA to more efficiently use its existing high performance computing assets.

Schedule and Milestones:

FY 2016

- Upgrade storage capacity of climate model data archive
- Develop the initial physical formulations to incorporate soot and dust aerosol impacts on snow and ice albedo in climate models, and improve sea ice models essential to developing a predictive understanding of Arctic climate change
- Prepare limited benchmark suite for operational fine-grain architecture acquisition
- Migrate minor applications to perform in balance with major applications

FY 2017

- Complete migration of major applications
- Complete requirements for operational acquisition of classical architecture with limited fine-grain architecture
- Migrate minor applications to perform in balance with major applications

FY2018

- High-resolution Earth System Model integrations publically available for use in regional decision-making through federated data services
- Exploratory application of Earth System Models using exascale high-performance computing platforms, which would be capable of at least one exaflop, or a thousand petaflops
- Migrate minor applications to perform in balance with major applications

FY 2019

- High-resolution integrations for prediction of seasonal tornado risks at multi-month lead times
- Exploratory application of Earth System Models using exascale high-performance computing platforms
- Migrate minor applications to perform in balance with major applications

FY 2020

- Upgrade high-resolution Earth System Model integrations publically available for use in regional decision-making through federated data services
- Develop workflow for pre-exascale production computing using NOAA applications

Deliverables:

- Sustained high availability of the NOAA R&D HPCS
- Improved credibility of projections of changes of important climatic quantities, such as regional climate change and extreme events, to allow society to efficiently plan for and adapt to climate change
- Major contributions of model data to the Program for Climate Model Diagnosis and Inter-comparison, in support of national and international climate assessments
- Capability to develop and provide decadal prototype forecasts and predictions made with high-resolution coupled climate model
- NOAA’s environmental modeling applications able to utilize performance increases available through fine-grain architectures

Performance Goals and Measurement Data:

Performance Measure:	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
Maintain HPCC / R&D System Availability	99%	96%	96%	96%	96%	96%	96%
Description: Maintaining high system availability translates into providing NOAA scientists, researchers, and collaboration partners with the maximum number of computational hours available enabling them to conduct important R&D on an almost 24/7 basis. The HPCC program provides NOAA researchers with a reliable computing resource that allows them to plan, with a high degree of confidence, their project milestones and deliverables. System outages can adversely affect NOAA initiatives such as meeting the Intergovernmental Panel on Climate Change milestones or cause delays in implementing operational improvements for hurricane track and intensity predictions. Ensuring high system availability enables NOAA to maximize its investment in these resources.							

Performance Measure:	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
Increase percent of codes ported to fine-grain architectures in NOAA’s model suite	0	30%	60%	100%	100%	100%	100%
Description: NOAA models are currently written to maximize efficiency on scalar computer architectures. It is expected that architectures based on fine-grained computing technologies will be replacing current architectures in the near future. NOAA must prepare mission critical applications to efficiently execute on next generation HPC architectures while maintaining performance levels on the current HPC. This performance measure tracks the re-coding of these applications to run on fine-grained architectures.							

PROGRAM CHANGES FOR FY 2016:

Research Supercomputing: Research & Development High Performance Computing Recapitalization (Base Funding: \$13,379,000 and 0 FTE; Program Change: +\$9,000,000 and 0 FTE): NOAA requests an increase of \$9,000,000 and 0 FTE for a total of \$22,379,000 and 0 FTE to recapitalize NOAA's research and development (R&D) high performance computing (HPC) infrastructure and to provide capacity to support regional sea level rise modeling.

Proposed Actions:

With this proposed investment, NOAA will begin recapitalizing the R&D supercomputer located at the Department of Energy's (DOE) Oak Ridge National Laboratory in Oak Ridge, Tennessee (Gaea). This proposed increase would establish a permanent source of funding that would allow NOAA to maintain its scientific leadership and organizational excellence through regular refresh and recapitalization, via leasing mechanisms, of this R&D HPC resource. In addition, this increase would provide additional capacity to support regional sea level rise modeling.

By 2016, NOAA's R&D supercomputer (Gaea) will be at the end of its useful life. Without additional funding, NOAA will have to fund recapitalization of the Gaea supercomputer within current resources, resulting in diminished R&D supercomputer capacity for weather and climate modeling and research that run on Gaea now. Reduced R&D supercomputer capability will stagnate mission-critical scientific advancements and model development, and restrict the production of climate predictions on all time scales.

The additional capacity for sea level rise work will be provided as part of the Gaea recapitalization. The compute time for this work will be provided through NOAA's HPC allocation process, which is overseen by NOAA's HPC Board.

Statement of Need and Economic Benefits:

NOAA's environmental modeling enterprise underpins most of NOAA's products and services to the Nation. NOAA's R&D HPC assets are part of the critical infrastructure required for NOAA to accomplish its mission. There is a growing HPC user base in the geospatial and ecosystems research communities within NOAA. FY 2013 marked the first year that every NOAA line office received an allocation on one of the R&D HPC systems.

Several reports (e.g., the [Federal Plan for High-End Computing](#)²³ and [A National Strategy for Advancing Climate Modeling from the National Research Council](#))²⁴ recommend the U.S. adopt a high-performance computing strategy that promotes tiers of performance. NOAA's current R&D HPC systems, Gaea and Zeus, were purchased under the American Recovery and Reinvestment Act (ARRA) of 2009, through a collaborative partnership between NOAA and DOE. Zeus is being recapitalized as part of the Disaster Relief Appropriations Act, 2013. While NOAA's research community has benefited from these emergency supplemental funding sources, it is not a sustainable, efficient way to provide HPC capacity for scientific modeling. The computing is able to meet the short term needs of the programs that it is procured to support, but large capital purchases open NOAA to the risk of reduced computing capability when the agency can no longer afford to

²³ High-End Computing Revitalization Task Force. Federal Plan for High-end Computing. Executive Office of the President, Office of Science and Technology Policy, 2004.

²⁴ National Research Council. A National Strategy for Advancing Climate Modeling. The National Academies Press, 2012.

operate and maintain these systems at the end of their lives, or procure additional HPC capability, without an infusion of new funding.

This ad-hoc approach to funding severely limits progress in NOAA's long lead time research because the amount of computing available to achieve its environmental modeling goals becomes uncertain. As a consequence, execution plans must be rolled back to align with anticipated reduced computing, since this is all that can be counted on. Specifically, model resolution may be reduced, so regional information may not be available; models may be simplified, so the complex processes needed for accurate predictions may be lost; and fewer experiments may be performed, resulting in poorly quantified uncertainty. In contrast, a steady stream of funding that supports the leasing, acquisition, operation, and maintenance of the systems delivers known quantities of computing in the longer term. This enables greater certainty and longer lead times for planning and executing NOAA's environmental modeling activities. In addition, recapitalizing the HPC systems through leasing mechanism shifts the equipment's future obsolescence to the service provider.

Resource Assessment:

Current NOAA HPC resources provide equipment maintenance, support, facilities lease, electrical power, and data network communications costs for operational and R&D systems. Competitive performance-based contracts are used to provision computing at the best value for NOAA. HPC resources are managed through NOAA's HPC Board to meet NOAA's mission goals and objectives. NOAA's successful HPC program demonstrated efficiencies by consolidating HPC acquisitions and systems. The program uses HPC shared services at Oak Ridge National Laboratory through an interagency agreement with the Department of Energy and is actively supporting data center consolidation initiatives Department-wide through shared use of the program's HPC facilities. NOAA is also leveraging the Nation's advanced research networking infrastructure at affordable pricing through the use of Internet2 and university consortiums providing regional optical network services. New resources must be provided to prepare NOAA's mission-critical applications to efficiently execute on next generation HPC architectures while maintaining performance levels on the current HPC.

Schedule and Milestones:

FY 2016

- Begin procurement process for Gaea replacement

FY 2017

- Delivery of Gaea replacement system, including additional capacity for sea level rise work
- Acceptance of Gaea replacement system

FY 2018

- Begin planning process for replacement of Zeus system in Fairmont, West Virginia

FY 2019

- Begin planning for tech refresh of Gaea

FY 2020

- Deliver Zeus replacement

Deliverables:

- High-resolution (3-10 km) ocean models accounting for ocean eddy circulations, ocean-ice interactions and global and regional sea-level rise
- High-resolution (1-3km) storm-resolving regional models embedded in coarse resolution (15km) global models

- Coupled climate models using state-of-the-art atmosphere, ocean, biosphere, and cryosphere components to accelerate the delivery of high-resolution regional climate information
- Fully interactive atmospheric chemistry, aerosol, and cloud physics in high-resolution coupled models
- Complete biogeochemical cycle modeling (e.g., for nitrogen and phosphorous) together with improved representation of open ocean and coastal mechanisms

Performance Goals and Measurement Data

Performance Measure: Improve treatment of key physical processes in climate models aimed at improving: model performance, understanding of uncertainties, and confidence in climate change projections and predictions. (Number of Key Physical Processes)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	3	3	4	5	6
Without Increase	3	3	3	3	3	3	3
Description: This performance measure will reflect more confident projections of key climate change impacts. Inputs to this cumulative index are (1) Improved cloud and water vapor observations; (2) improved aerosol precipitation susceptibility index; (3) improved parameterizations and modeling of clouds, aerosols, and water vapor; and (4) number of products transitioned that include new parameterizations.							

Performance Measure: Expand number of new seasonal-to-decadal prototype forecasts and predictions made with high-resolution coupled climate model for global-to-regional scales (Cumulative number of Forecasts)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	2	3	5	7	9
Without Increase	0	1	2	3	4	5	6
Description: Research into seasonal-to-decadal predictability will enhance prototype forecasts incorporating new data assimilation schemes and new high-resolution models that resolve regional scales around the globe that this computing enhancement would permit.							

Performance Measure: Reduce 10-day forecast error for 850 and 250 wind forecasts toward 7-day skill (baseline FY 2013).	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	3%	3%	3%	10%	10%
Without Increase	3%	3%	3%	3%	3%	3%	3%
Description: Understanding upper troposphere winds are important to aviation forecasting. Lower troposphere winds forecasting is important for winter storm and tropical storm prediction. These wind metrics would be applied in the northern and southern hemispheres and in the tropics. They would be compared against both gridded analysis data and against weather observations such as from weather balloons.							

Outyear Funding Estimates (\$ in Thousands)

Research Supercomputing	FY 2015 & Prior	FY 2016	FY 2017	FY 2018	FY 2019	CTC	Total
Change from FY 2016 Base		9,000	13,000	17,000	21,000		
Total Request	318,814	22,379	26,379	30,379	34,379	N/A	Recurring

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: Office of Oceanic and Atmospheric Research
Sub-program: OAR Systems Acquisition
Program Change: Research & Development High Performance Computing Recapitalization

Object Class		FY 2016 Decrease	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	0	\$0
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	<u>0</u>	<u>0</u>
12	Civilian personnel benefits	0	0
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	0
22	Transportation of things	0	0
23.1	Rental payments to GSA	0	0
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and miscellaneous charges	0	1,270
24	Printing and reproduction	0	0
25.1	Advisory and assistance services	0	0
25.2	Other services	0	6,477
25.3	Purchases of goods & services from Gov't accounts	0	3,186
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	129
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	687
31	Equipment	9,000	10,035
32	Lands and structures	0	595
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	0
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	<u>9,000</u>	<u>22,379</u>

BUDGET PROGRAM: NATIONAL WEATHER SERVICE

For FY 2016, NOAA requests a total of \$1,098,878,000 and 4,540 FTE for the National Weather Service, including a decrease of \$7,918,000 and a decrease of 98 FTE in net program changes.

National Weather Service Overview

The National Weather Service (NWS) (<http://www.weather.gov/>) provides weather, water, and climate forecasts and warnings for the United States, its territories, adjacent waters, and ocean areas for the protection of life and property and the enhancement of the national economy 24 hours every day. NWS is the sole, official and authoritative U.S. voice for issuing warnings during life-threatening weather situations. NWS forecasters issue public, aviation, marine, fire weather, climate, space weather, river and flood forecasts and warnings every day. NWS data and products form a national information database and infrastructure, which can be used by the public, other governmental agencies, the private sector, and the global community.

In 2015, NOAA restructured NWS Operations, Research, and Facilities (ORF) and Procurement, Acquisition, and Construction (PAC) account Programs, Projects, and Activities (PPA) as part of a broader effort to align the NWS budget to function. The FY 2016 budget submission continues to define the future NWS and make the bold vision for a Weather-Ready Nation (WRN), a reality. NWS is moving quickly and deliberately towards a WRN which includes a fully integrated field structure, consistent products and services and an organization capable of change and innovation. As these changes are implemented, the NWS will better support public and private users, including emergency managers and businesses make faster, smarter decisions that save lives and protect livelihoods. NWS' evolution is guided by the National Academy of Sciences, "*Becoming Second to None*," and the National Academy of Public Administration (NAPA), "*Forecast for the Future: Assuring the Capacity of the NWS*" reports.

The NWS is organized into five ORF sub-programs totaling \$976,496,000 and 4,638 FTE.

- Observations (\$212,509,000 and 804 FTE) includes operational requirements of systems collecting observations necessary to provide weather forecasts, warnings, and outlooks, such as the Next Generation Weather Radar (NEXRAD), the Automated Surface Observing System (ASOS), and Radiosondes.
- Central Processing (\$98,002,000 and 232 FTE) includes the management of the information technology infrastructure supporting national centers and field operations including the Weather and Climate Operational Supercomputing System (WCROSS), the Advanced Weather Interactive Processing System (AWIPS), and hydrology information technology initiatives.
- Analyze, Forecast and Support (\$493,545,000 and 3,010 FTE) includes the operation of a distributed network of forecast offices and specialized centers comprising a workforce of meteorologists, hydrologists, climatologists, and space physicists, which provide up-to-date and accurate weather forecasts, warnings, and outlooks to the Nation.
- Dissemination (\$46,743,000 and 82 FTE) includes operations of the communication infrastructure required for collecting, tailoring, and distributing of information and products to customers and partners, such as the Telecommunications Gateway and NOAA Weather Radio.
- Science and Technology Integration (\$125,697,000 and 488 FTE) includes efforts of the NWS' operational modeling suite and other research to operations activities that

advance weather and climate prediction, such as the Hurricane Forecast Improvement Project to better hurricane track and intensity predictions.

The NWS is organized into two sub-programs in the PAC account totaling \$130,300,000 and 22 FTE:

- Systems Acquisition:
 - Observations (\$9,300,000 and 0 FTE) supports enhancement and life-cycle of systems collecting and processing observations necessary to provide weather forecasts, warnings, and outlooks, such as the Next Generation Radar (NEXRAD).
 - Central Processing (\$64,000,000 and 22 FTE) provides operational and developmental high performance computing (HPC) capacity and forecast and process improvements within the Advanced Weather Interactive Processing System (AWIPS).
 - Dissemination (\$45,000,000 and 0 FTE) enhances infrastructure and expands capacity of NWS dissemination systems to meet new satellite and model data requirements, including the Telecommunications Gateway and upgrading select NOAA Weather Radio locations.
- Construction:
 - Facilities Construction & Major Repairs (\$12,000,000 and 0 FTE) includes upgrades and improvements to NOAA's Forecast Offices and facilities.

NWS strives to provide a broad spectrum of weather, climate, and hydrological forecast guidance and decision support services to the American public. As more sectors of the economy recognize the impacts of weather and water on their businesses, they are becoming more adept at using sophisticated weather and water information to improve commerce. According to the American Meteorological Society, weather is directly linked to public safety, and a significant portion of the U.S. economy is weather-sensitive. Concern for public safety drives NWS to improve the timeliness and accuracy of warnings for all weather-related hazards. In turn NWS measures public and private sector satisfaction with NOAA information and warning services, through surveys and analysis of emergency managers, first responders, natural resource and water managers, public health professionals, industry, government and the public. NWS then uses these results to inform service improvements.

NWS is committed to enhancing observation capabilities by: (1) improving data assimilation that effectively uses all relevant data collected by NWS and others; (2) improving research community collaboration through creative approaches such as community modeling; by rapidly transforming scientific advances in modeling into improved operational products; (3) improving the techniques used by our expert forecasters; (4) making NWS information available quickly, efficiently, and in a useful form such as the National Digital Forecast Database; (5) incorporating forecast uncertainty to help customers make better-informed decisions; (6) leveraging emerging technologies to disseminate this information; and (7) maintaining an up-to-date technology base and a trained workforce to integrate these tools to maximum effect.

NWS operates and maintains critical infrastructure, which enables the provision of NOAA's services to the Nation. NWS manages a distributed network of offices that span the Nation, delivering essential NOAA services, especially those related to high-impact events, at the local level where critical, life-saving decisions are made. This includes the management of all major weather observing systems, from software engineering and communications to facilities and logistics planning. NWS also ensures worldwide acquisition and delivery of weather and water

data through the Telecommunications Gateway and the Office of Operational Systems Network (OPSnet). In support of NOAA's operational forecasting mission, NWS develops, improves and monitors data assimilation systems and models of the atmosphere and oceans, using advanced methods developed internally as well as cooperatively with scientists from universities, NOAA laboratories, other government agencies, and the international scientific community.

In accordance with NOAA's strategic vision, NWS launched its WRN initiative to build community resilience in the face of increasing vulnerability to extreme weather and water events. The initiative includes improvements to support management of the Nation's water supply, understanding of climate-related risks, economic productivity, and healthy communities and ecosystems. Record-breaking snowfall, cold temperatures, extended drought, high heat, severe flooding, violent tornadoes, and massive hurricanes have all combined to reach the greatest number of multi-billion dollar weather disasters in the Nation's history. The devastating impacts of extreme events can be reduced through improved readiness, which is why NWS is reacting with the WRN initiative to further reduce the Nation's weather-related vulnerabilities. The initiative will be enacted through improvements to demand-driven support services, innovative technology, and specialized training of our workforce.

Building a WRN requires the participation and commitment of a vast nationwide network of partners that comprise the weather and water enterprise including other government agencies, emergency managers, researchers, the media, the private sector and more to assess why the Nation is experiencing such extreme impacts. NWS depends on partners including other NOAA line offices to acquire data, conduct research, provide education and training, help disseminate critical environmental information, and provide advice to make best use of NWS information.

Performance:

NWS is a customer-oriented, public service focused government agency. NWS delivers a large number of weather forecasts, warnings, and advisories every day that are used by virtually every American. As a professional science-based agency, verification of organizational performance is an integral part of NWS' business process. NWS uses the performance management process to align resources, systems, and workforce to achieve service based objectives and priorities for the Nation. The integrated investments for Observations to Central Processing to Analyze, Forecast and Support to Disseminate to Science and Technology Integration to Facilities Construction and Major Repairs are managed to continuously improve NWS forecast and warning service. The effectiveness of these investments is assessed using numerous internal and external performance measures including the Government Performance and Results Act (GPRA) goals. These efforts have been institutionalized in NWS operations to maintain quality control and use objective methods to assess NWS performance.

Performance Goals and Measurement Data:

Performance Measure	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
Tornado Warnings Lead Time, Indicator 3.2b	9	13	13	13	13	13	13
Tornado Warnings Accuracy, Indicator 3.2b	60	72	72	72	72	72	72
Tornado Warnings False Alarm Ratio, Indicator 3.2b	70	72	71	71	71	71	71
Flash Flood Warnings Lead Time, Indicator 3.2c	56	61	61	63	65	65	65
Flash Flood Warnings Lead Accuracy, Indicator 3.2c	78	76	76	76	76	76	76
48 hour Hurricane Track Error in nautical miles, Indicator 3.2d	77	80	78	77	77	77	77
48 hour Hurricane Intensity Error in knots, Indicator 3.2e	14	10	9	7	6	6	6
Accuracy (%) (Threat score) of Day 1 precipitation forecasts, Indicator 3.2f	33	32	33	33	33	33	33
Winter Storm Warnings Lead Time, Indicator 3.2g	22	20	20	20	20	20	20
Winter Storm Warnings Accuracy, Indicator 3.2g	89	90	90	90	90	90	90
Marine Wind Speed Forecast Accuracy, Indicator 3.2h	78	75	75	76	76	76	76
Marine Wave Height Forecast Accuracy, Indicator 3.2h	84	76	76	77	77	77	77

Aviation Forecast IFR Accuracy, Indicator 3.2i	62	65	65	65	65	65	65
Aviation Forecast IFR False Alarm Ratio, Indicator 3.2i	36	38	38	38	38	38	38
Geomagnetic Storm Forecast Accuracy, Indicator 3.2j	40	53	53	53	53	53	53
U.S. Seasonal Temp. Forecast Skill, Indicator 3.1e	26	24	25	26	26	26	26

Research and Development (R&D) Investments:

The NOAA FY 2016 Budget estimates for R&D investments are the result of an integrated requirements-based strategic planning process. This process provides the structure to link NOAA's strategic vision with programmatic detail and budget development, with the goal of maximizing resources while optimizing capabilities. NWS requests \$22,113,000 for investments in R&D in the FY 2016 budget.

The NOAA Research Council - an internal body composed of senior scientific personnel from every Line Office in the agency - developed NOAA's most recent Five-Year Research and Development Plan (FY 2013-2017). This plan guides NOAA's R&D activities and provides a common understanding among NOAA's leadership, its workforce, its partners, constituents and Congress on the value of NOAA's R&D activities.

Significant Inflationary Adjustments:

NOAA's FY 2016 Base includes a total of \$19,343,000 and 0 FTE to account for the full funding requirement for inflationary adjustments to current programs for NWS activities. This includes the estimated 2016 Federal pay raise of 1.3 percent as well as inflationary increases for non-labor activities, including service contracts, utilities, field office lease payments, and rent charges from the General Services Administration (GSA).

NWS also requests the following transfers for a net change to NOAA of \$0 and 0 FTEs.

From Office	PPA	To Office	PPA	Amount (\$000)/ FTE
NWS	Observations (PAC)	NWS	Observations (ORF)	\$3,000,000/ 0 FTE
NWS	Observations (ORF)	NWS	Dissemination (ORF)	\$6,000,000/ 0 FTE

NWS requests a technical adjustment to move \$3,000,000 and 0 FTE from the Systems Acquisition, Observations PPA in PAC to the ORF Observations PPA. This adjustment reflects the completion of the Radiosonde Replacement System (RRS) Program. The transfer is required to sustain the procurement of Global Positioning System (GPS) radiosondes, and consolidates all radiosonde acquisition in the ORF Observations PPA.

NWS requests a technical adjustment to move \$6,000,000 and 0 FTE from the Observations ORF PPA to the Dissemination ORF PPA. In FY 2015 NWS began executing in a new, approved PPA structure. NWS has realized that the full scope of dissemination costs across the Line Office was not accounted for during the original formation of the portfolio budget estimate two years ago. Specifically, dissemination operation and maintenance (O&M) costs were not fully taken into account in the new structure. This transfer will not impact any observation system or data availability.

Headquarters Administrative Costs:

In FY 2016, NWS Line Office headquarters (HQ) will use \$34,564,194 in funds to support general management activities, financial and budgeting, and IT related expenses, as well as supporting facilities and other general operating costs. In FY 2016, NWS will be operating in a new portfolio based HQ structure, which began implementation in FY 2015. These funds also include support for service contracts, utilities, and rent charges from the General Services Administration. Specifically, NWS will use headquarters administrative funds to support the following:

Headquarters Program Support Type	Description	FY 2016 Amount	FY 2016 FTE associated with NWS HQ
General Management & Direction/Executive Management	Includes Assistant Administrator's office, public affairs, information services	\$15,529,760	81.0
Budget & Finance	Includes Budget, Finance and Accounting	\$6,285,018	20.0
Information Technology (IT)	Includes IT-related expenses and other CIO related activities	\$4,418,799	16.0
Facilities/Other Administrative (CAO Functions)	Includes Facilities and Security costs, as well as other CAO related activities	\$6,387,436	18.0
Human Resources	All HR services, including EEO	\$1,943,181	13.0
TOTAL		\$34,564,194	148.0

**APPROPRIATION ACCOUNT: OPERATIONS, RESEARCH, AND FACILITIES
SUB-PROGRAMS: OBSERVATIONS; CENTRAL PROCESSING; ANALYZE, FORECAST
AND SUPPORT; DISSEMINATION; SCIENCE AND TECHNOLOGY INTEGRATION**

The objectives of the sub-programs are to:

- Provide up-to-date and accurate weather forecasts, warnings, and outlooks to the Nation;
- Support the emergency management community;
- Engage in outreach and education activities to support public decisions;
- Maintain the operations of systems that collect observations necessary to provide weather forecasts, warnings, and outlooks to the Nation;
- Maintain processing systems necessary to generate weather forecasts, warnings, and outlooks to the Nation; and
- Improve services by integrating new advances in science and technology.

NWS has nearly 4,600 FTEs in 122 Weather Forecast Offices (WFO), 13 River Forecast Centers (RFC), 9 National Centers for Environmental Prediction (NCEP), and other support offices around the country. NWS supports a national infrastructure to gather and process data worldwide from the land, sea, and air. This infrastructure collects data from technologies such as Doppler weather radars, satellites operated by NOAA's National Environmental Satellite, Data, and Information Service (NESDIS), marine data buoys, surface observing systems, and instruments for monitoring space weather. These data feed sophisticated models running on high-speed supercomputers. A highly trained and skilled workforce uses powerful workstations to analyze all of these data and issue forecasts and warnings. High-speed communications tie this entire information infrastructure together and disseminate forecasts and warnings to the public.

Trained community volunteers also enhance NWS operations. Cooperative observers collect weather data that become part of the Nation's climate records and citizen storm spotters provide visual confirmation of severe weather events. As environmental information becomes more sophisticated and accessible, the environmental literacy of the public becomes more important. NWS outreach and education activities are aimed at ensuring the public understands NWS' information and effectively integrate it into their decision making.

OBSERVATIONS

NWS is fundamentally dependent on environmental observations from the surface of the sun to the bottom of the sea to meet its forecast and warnings mission. Observing the environment requires integration of all available sources; to include both in-situ and remotely-sensed data from satellites and radars, and data from NOAA systems, commercial sources, Federal and even international partners. No single observation source can stand on its own.

The Observations PPA supports the life-cycle of all NWS observing system investments and includes observational requirements analysis for NOAA systems such as satellites. This PPA manages the activities from evaluating observational requirements, engineering technical solution, to systems development and testing, operational implementation, and routine system maintenance. NWS missions, from issuing timely and accurate tornado and flood warnings to providing weather forecasts and accurate seasonal predictions, depend on data from an integrated suite of observing systems. Observing systems must provide a global picture of the atmosphere and oceans, as well as high-definition 3-dimensional views of individual storms.

Together, observing systems enable forecasters to identify emerging threats, characterize the severity of the threat, and provide detailed warnings and forecasts of an event.

Observation systems must measure a broad array of parameters to support forecasting in the varied mission service areas of the NWS: aviation weather, severe weather, space weather, tropical weather, tsunami and more. Sensors must operate in a variety of environments and conditions. Meeting operational observing systems requirements and sustaining observing systems life-cycle investments are key to the success of other NWS PPAs such as Analyze, Forecast and Support; Central Processing; and Science and Technology Integration. The optimal mix of observing systems is driven by mission and performance requirements and funding availability. Observation systems are integral to determining initial and boundary conditions for long term numerical weather prediction and climate forecasting while others may be critical for short term local warnings, watches and outlooks. All observing systems have strengths and weaknesses in monitoring the environment; individual systems in the overall suite must complement each other.

The Observations PPA assesses observation architecture alternatives based on analyses and studies to optimize an integrated observation system that maximizes NWS' ability to save lives and property while improving trade and commerce. This PPA assesses the effectiveness of NOAA's integrated observing systems and recommends necessary configuration changes to meet the requirements and maximize the benefits of a WRN.

Specifically, the Observations PPA:

- Manages operations and maintenance of NWS observational suites;
- Provides holistic, on-going assessments/analyses of the observation system portfolio;
- Identifies and validates NWS' observation requirements;
- Seeks solutions to fulfill NWS' observation requirements;
- Develops a strategy to maximize effectiveness while minimizing cost; and
- Coordinates NWS' observation system activities with NOAA and its partners.

To achieve these goals, Observations maintains the following programs:

Upper Air (UA) Observations Program provides meteorological data above the surface to support NWS forecast operations. To achieve this requirement, NWS operates a radiosonde network, acquires observations from private and commercial aircraft, acquires lightning data from commercial vendors, and operates a wind profiler network in Alaska.

- Each year, NWS launches over 78,000 radiosondes from locations throughout the United States and its possessions, including the Caribbean and Pacific Island nations. A radiosonde, is a small, expendable instrument package launched by a large hydrogen or helium gas filled balloon, and provides atmospheric profiles of pressure, temperature, relative humidity and winds aloft. These data are critical inputs for NWS weather prediction models and NWS forecaster operations supporting severe storm, aviation and marine forecasts, and climate and other research uses. Radiosondes also serve to provide a reference for satellite sounding data.
- NWS leverages private-public partnerships with the aviation community to obtain additional upper air observational data. These aircraft provide accurate information near major airports up to 40,000 feet and enroute at flight level. Meteorological Data, Collection and Reporting System (MDCRS) equipped aircraft currently provide temperature and wind information. The Water Vapor Sensor System (WVSS) program adds relative humidity observations to the MDCRS data stream.

- NWS also leverages private-public partnerships to obtain lightning data from several commercial providers and displays this information on the Advanced Weather Interactive Processing System (AWIPS) for real-time forecaster use and daily forecast verification.
- The Alaskan NOAA Profiler Network (NPN) consists of three Doppler radar sites providing continuous vertical wind profile data. This data is utilized as a forecast tool to validate numerical weather model information and to provide fidelity in public and aviation weather warnings in Alaska. The most critical use of the Alaska profiler network is to support the production of aviation warnings of volcanic ash. Alaska has 40 active volcanoes and ash can cause catastrophic engine failure for aircraft in flight.

Radar Observations Program provides meteorological data from the surface to approximately 10,000 feet above ground level to support the NWS forecast and warning mission. To achieve this requirement, NWS operates NEXRAD and acquires supplementary radar data from other sources.

- NEXRAD is a tri-agency weather radar system with NWS, the Department of Defense (DOD) and Federal Aviation Administration (FAA). Consisting of 160 operational radars, NEXRAD utilizes Doppler technology and hydrometeorological processing to significantly improve tornado and thunderstorm warnings, air safety, flash flood warnings, and water resources management. NEXRAD is the primary tool used by NOAA's meteorologists for issuing warnings for flash floods, tornadoes, and severe thunderstorms. NEXRAD data is integrated into the Nation's decision support serving air traffic management, homeland security, military operations, emergency management, and water resource management. NEXRAD data is vital to many sectors of the economy including the public, media, tourism, agriculture, transportation, and energy production.
- NWS leverages other radar data sources such as the FAA's Terminal Doppler Weather Radar (TDWR) to supplement and gap fill the NEXRAD network.

Surface Observations Program provides meteorological data at the surface to support the NWS forecast and warning mission. To achieve this requirement, NWS operates the Automated Surface Observing System (ASOS), the Cooperative Observer Program (COOP) and the National Mesonet Program.

- ASOS is the Nation's primary surface weather observing network supporting aviation operations and the needs of the meteorological, hydrological, and climatological research communities. ASOS is a tri-agency automated surface observation system with NWS, FAA, and DOD. Consisting of 1,001 operational systems located at airports, ASOS operates 24x7, significantly increasing the amount of reliable, continuous information available to forecasters and the aviation community.
- COOP, formally created in 1890 by the Organic Act, is a network of volunteer observers providing a significant and cost effective source of meteorological and climatological data representative of where our citizens live, work, and play. The COOP data are the primary data utilized in the NWS snowfall forecast guidance. The data are also critical for precipitation type and flood forecasts, drought monitoring, and disaster declarations. The COOP network continues to be used to prepare national, regional, and local climate forecasts and is critical in the development of climatological normals and averages.
- The National Mesonet provides localized, high resolution observations in both time and space. These data, combined with other observations throughout the vertical structure of the atmosphere, provide input to NWS models. Mesonet data can identify small scale features at the surface, such as changes in wind speed/direction, temperature and pressure - each of which can indicate rapidly deteriorating weather conditions not shown by other observations. Mesonet data is also a primary source for the National Centers for

Environmental Prediction's Real-Time Mesoscale Analysis products, developed to provide field forecasters with high quality analyses for nowcasting, situational awareness, and forecast verification purposes. In addition, the North American Mesoscale model and the hourly Rapid Refresh model take advantage of the high frequency nature of this data.

Marine Observations Program deploys and manages an enhanced observational network of buoys and coastal stations providing real-time meteorological, climatological and tsunami data in the open ocean and coastal zones surrounding the United States to support the NWS forecast and warning mission. NWS operates the Weather and Ocean Platform network, the Tropical Atmosphere Ocean (TAO) Array and the Deep-ocean Assessment and Reporting of Tsunamis (DART®) stations. NWS also supports maintenance of a number of coastal sea-level gauges and seismic networks to support tsunami detection, forecast and warning.

- The Weather and Ocean Platform is a global network of 149 meteorological and ocean observing platforms to provide real-time marine meteorological, oceanographic and geophysical observations. Included in this network is the 101 moored Coastal Weather Buoys (CWB) and 48 land-based Coastal Marine Automated Networks (C-MAN) stations that are operated by the NWS. They are deployed in the coastal and offshore waters from the western Atlantic, Gulf of Mexico and Caribbean Sea to the western Pacific Ocean around Hawaii, to the Bering Sea and in the Great Lakes. This network provides forecasters with frequent, high-quality marine observations for forecast and warning preparation and to verify forecasts after they are produced. Other users rely on the observations and forecasts for commercial and recreational activities. All stations measure wind speed, direction, and gusts; barometric pressure; and air temperature. In addition, all CWB stations, and some C-MAN stations, measure sea surface temperature and wave height and wave period. Conductivity and water current are measured at some stations as well.
- The TAO array is designed for the study of seasonal and year-to-year climatic variations related to El Niño and the Southern Oscillation (ENSO). The array consists of 55 moored ocean buoys and 4 Acoustic Doppler Current Profilers (ADCP) in the equatorial Pacific. The buoys collect real-time air temperature; relative humidity; wind speed and direction; ocean temperature and pressure; and some buoys collect shortwave radiation; rainfall amounts; and ocean currents.
- DART® stations, located throughout the Pacific Ocean, Atlantic Ocean, Caribbean Sea and Gulf of Mexico, collect observational data which is used by NWS' Tsunami Warning Centers to prepare and refine watches and warnings covering all U.S. territories and states bordering on the Pacific and Atlantic Ocean Basins. This data supports WFOs, Federal and state disaster agencies, military organizations, private broadcast media, and other facilities that furnish tsunami warning information to the public.
- NWS supports the maintenance of a number of the tsunami-capable tide gauges operated by both the NOS Center for Operational Oceanographic Products and Services (CO-OPS), and the University of Hawaii Sea Level Network. These sensors provide the NWS Tsunami Warning Centers with coastal water-level information updated every minute in key tsunami threat regions. NWS also contributes to the maintenance of various seismic networks in Alaska, Hawaii, and the Caribbean. These networks are specifically designed and deployed to provide near-real-time detection of potentially tsunami-generating seismic events.

Systems Engineering and Support provides systems acquisition engineering and logistics support for NWS mission critical observing systems. Systems Engineering and Support provides functional expertise necessary to design, acquire, test and provide life cycle support for systems used by NWS to accomplish its mission of protecting life and property. Actions are to:

- Perform system engineering and acquisition to support operational weather systems;

- Plan, coordinate, and implement hardware modifications, retrofits and rehabilitation programs to meet changing program requirements and improving system performance;
- Direct product identification, configuration control, auditing, and status accounting for all systems that are under formal NWS Configuration Management control;
- Prescribe and manage efficient logistics stocking levels and ensuring procurement of initial and replenishment spares for depot-level stock;
- Provide depot level maintenance, repair, and quality assurance of new and reconditioned parts shipped to field organizations around the world;
- Provide warehouse support and world-wide distribution of mission critical components for NWS, DOD and FAA;
- Develop and maintaining software for Surface and Upper Air systems; and
- Perform system and operational tests and evaluation of alternative systems.

Schedule and Milestones:

FY 2016 – 2020

- Acquire additional water vapor data via aircraft observation
- Maintain the tri-agency NEXRAD radar network
- Maintain the tri-agency ASOS system
- Maintain National Mesonet Program Office
- Operate and maintain weather/ocean buoy, C-MAN, DART stations and TAO array
- Sustain critical observing system networks and the operations and maintenance of (tsunami-reporting) seismic sensors and sea-level stations
- Improve and maintain paperless reporting of COOP data

FY 2016

- Complete deployment of NEXRAD Radar Products Generator (RPG) and Radar Data Acquisition (RDA) Software Build 16
- Develop and test NEXRAD RPG and RDA Software Build 17
- Complete deployment of hardware refresh for Frame Relay Hub Routers
- Develop, test, and deploy TDWR Supplemental Product Generator (SPG) Build 8
- Develop, test, and deploy NOAA Profiler Network Software Build 2.x
- Manage acquisition for ASOS Service Life Extension Program equipment
- Evaluate ASOS telecommunications improvement options
- Purchase 500 Wireless Temperature Systems for COOP, deploy as required
- Purchase 100 Soil Temperature Systems, deploy as required

FY 2017

- Deploy NEXRAD RPG and RDA Software Build 17
- Develop and test NEXRAD RPG and RDA Software Build 18
- Develop and test IT Refresh Hardware for NEXRAD RPG Console Server and RDA Global Positioning System (GPS)
- Develop, test, and deploy TDWR SPG Build 9
- Develop, test, and deploy NOAA Profiler Network Software Build 3.x
- Implement ASOS Service Life Extension Program equipment
- Purchase 500 Wireless Temperature Systems for COOP, deploy as required
- Purchase 100 Soil Temperature Systems, deploy as required

FY 2018

- Deploy NEXRAD RDA and RPG Software Build 18
- Develop and Test NEXRAD RDA and RPG Software Build 19
- Develop and Test IT Refresh for RPG Router, RPG LAN Switch and RDA Calibration Tool
- Deploy IT Refresh for NEXRAD RDA GPS and RPG Console Server

- Develop, test, and deploy TDWR SPG Build 10
- Develop, test, and deploy NOAA Profiler Network Software Build 3.x
- Implement ASOS Service Life Extension Program equipment
- Purchase 500 Wireless Temperature Systems for COOP, deploy as required
- Purchase 100 Soil Temperature Systems, deploy as required

FY 2019

- Deploy NEXRAD RDA and RPG Software Build 19
- Develop and Test NEXRAD RDA and RPG Software Build 20
- Develop, test, and deploy TDWR SPG Build 11
- Deploy IT Refresh for RPG Router, RPG LAN Switch, and RDA Calibration Tool
- Develop and Test IT Refresh for MSCFs, RPG/RDA Power Administrators, and KVMs
- Develop, test, and deploy NOAA Profiler Network Software Build 4.x
- Implement ASOS Service Life Extension Program equipment
- Purchase 500 Wireless Temperature Systems for COOP, deploy as required

FY 2020

- Deploy NEXRAD RDA and RPG Software Build 20
- Develop and Test NEXRAD RDA and RPG Software Build 21
- Develop, test, and deploy TDWR SPG Build 12
- Deploy IT Refresh for RPG LAN Switch and RDA Calibration Tool
- Develop and Test IT Refresh for RPG CPUs and UPS
- Develop, test, and deploy NOAA Profiler Network Software Build 5.x
- Acquire additional water vapor data via aircraft observation
- Continue implementation of ASOS Service Life Extension Program
- Purchase 500 Wireless Temperature Systems for COOP, deploy as required

Deliverables:

- Support operations of 102 radiosonde stations in the United States and possessions, Caribbean, and Pacific Island nations
- Support operations of three Wind Profiler systems in Alaska
- Support operations of 122 NEXRAD systems at 96 percent availability
- Support operations of 45 TDWR SPG systems
- Support operations of 315 NWS ASOS units and maintenance of 572 FAA ASOS units under a reimbursable funding arrangement
- 500 Wireless Temperature Systems on shelf at NLSC with deployment criteria
- 100 Soil Temperature Systems on shelf at NLSC with deployment criteria
- Paperless COOP data reporting system online within NWS IT infrastructure
- Hourly marine weather wind speed and direction, air and sea temperature, atmospheric pressure, and detailed wave information
- Support operations of 39 DART® stations located throughout the Pacific Ocean, Atlantic Ocean, and Caribbean with availability of 80 percent (assumes adequate ship time funding provided by the Tsunami Program)
- Support operations of the TAO buoy array at 80 percent data availability (assumes adequate ship time provided by OMAO)
- Support operations of 101 CWB systems at 80 percent data availability (assumes adequate ship time provided by the U.S. Coast Guard)
- Support operations of 47 C-MAN stations at 80 percent data availability

CENTRAL PROCESSING

Central Processing ingests data obtained from the Observations PPA to provide guidance for use by NWS under its Analyze, Forecast and Support PPA and directly to the weather enterprise and the general public. Central Processing ensures the uninterrupted flow of information from collection of observations to central guidance production to local applications of all essential weather and climate data products, and continuity of public watches and warnings. This includes the management and systems administration of the Weather and Climate Operational Supercomputing System (WCOSS), AWIPS, hydrology information technology initiatives, and the IT infrastructure supporting national centers and field operations. Central Processing also provides development infrastructure for the Science and Technology Integration (STI) PPA, including the NOAA research and development supercomputer and the Joint Center for Satellite Data Acquisition (JCSDA).

Central Processing provides holistic, on-going assessment and analysis of the systems listed above and specific recommendations for changes to the configuration of NWS' processing systems to maximize the benefit to NWS and its many constituents.

In general, Central Processing will:

- Operate NWS' IT processing infrastructure;
- Identify NWS' processing requirements and gaps;
- Review NWS' processing system capabilities;
- Seek solutions to fulfill NWS processing requirements;
- Develop a strategy to maximize effectiveness while minimizing cost;
- Coordinate NWS' processing system activities across NOAA; and
- Maintain a 24/7 help desk for all forecast systems.

Central Processing manages the following programs:

National Centers for Environmental Prediction (NCEP) Central Operations (NCO) provides support for WCCOS including the operational model production suite and associated infrastructure which forms the basis for much of the NCEP Centers and Forecast Offices (FO) weather forecast services through its Weather and Climate Computing Infrastructure Services (WCCIS) program. WCCIS provides the following services:

- Performs operational quality assurance of incoming observations and outgoing products;
- Transitions numerical weather and climate prediction models from development into operational use by forecasters at NCEP and the FOs;
- Performs system maintenance and administration service on a 24-hour basis;
- Performs software development for data processing, display, interaction, and product generation;
- Supports on-demand requirements including dispersion forecasts for volcanic ash, smoke, and emergency releases;
- Monitors the execution of the NCEP Production suite on a 24x7x365 basis; and
- Deploys and supports centralized dissemination systems on behalf of the Integrated Dissemination Program (IDP).

AWIPS is an information processing, display, and telecommunications system that is the cornerstone of NWS field operations. AWIPS provides the following services:

- Integrates and displays meteorological and hydrological data, satellite, and radar data at NWS field offices;

- Acquires and processes data from sensors and local sources;
- Provides computational and display functions at operational sites;
- Provides an interactive communications system to interconnect NWS operational sites;
- Initiates the dissemination of weather and flood warnings and forecasts in a rapid and highly reliable manner; and
- Provides the communication interface to much of NOAA's real-time environmental data for internal and external users.

Hydrology information technology initiatives include the Advanced Hydrologic Prediction System (AHPS) and Community Hydrologic Prediction System (CHPS). AHPS is a web-based suite of river-forecast products providing information on the magnitude and certainty of occurrence of floods or droughts, from hours to days and months before an event. When implementation is complete in 2017, advanced river forecast information will be provided at 4,011 locations throughout the United States to assist emergency managers, water managers, and the general public in making decisions based on improved forecasts and the certainty of a hydrologic event. CHPS is the information technology infrastructure used to enable access to hydrologic models at all 13 River Forecast Centers (RFCs) leading to improved river forecasting. These tools enable products that community leaders and emergency managers use to effectively respond to flooding events.

National Centers and Regional IT Infrastructure

Central Processing will maintain the information technology infrastructure and standards which enable the National Centers and regional offices, including forecast offices to effectively work together. This includes:

- Computing that occurs outside of AWIPS
- Local area networking
- Security
- Data center power and cooling

Schedule and Milestones:

FY 2016-FY 2020

- Manage HPC usage, reliability, and resources including a major system upgrade
- Support scheduled improvements to NCEP Production Suite
- Complete deployment of AWIPS II architecture
- Complete AWIPS contract transition; Deploy of updated AWIPS hardware infrastructure; and Maintain updated AWIPS architecture
- Continue to improve flood lead time and accuracy improvement
- Transition multiple major systems onto the IDP infrastructure

Deliverables:

- WCOSS capacity dramatically increased and meeting or exceeding reliability metrics
- Integrated Dissemination System under full operational support with twin data centers
- 43 million numerical prediction products produced per day for weather, climate, ocean, river, and space-weather forecasts
- AWIPS II deployment at all forecast offices and National Centers
- AWIPS II program under new competitively bid contract
- 4,011 operational AHPS forecast locations
- AHPS performance meeting or exceeding flood lead time and accuracy goals
- National Center and Regional IT infrastructure that meets operational reliability goals through improved annual maintenance

ANALYZE, FORECAST & SUPPORT

NWS' mission is to provide forecasts and warnings for the protection of life and property, especially in the provision of Impact-Based Decision Support Services (IDSS). It is at this juncture where NWS' highly skilled workforce provides significant value to achieve its mission. The Analyze, Forecast and Support (AFS) PPA leverages the work done by the Observations and Central Processing PPAs by applying expertise to observations, weather and water forecast data, guidance and local applications to produce forecasts, warnings, and IDSS for the Nation. AFS' weather, water, climate and space weather forecasts and warnings are critical to saving lives and property and enhancing the national economy, making it integral to the creation of a WRN.

AFS operates a distributed network of forecast offices and specialized centers and associated workforce of meteorologists, hydrologists, climatologists, and space physicists. They monitor the weather, water, climate and space from our oceans to the surface of the sun 24 hours a day, seven days a week to support other government agencies, the business community, private citizens and international partners. Forecasts are used globally to support agriculture, transportation and water management among other missions. Alerts, provided days in advance, of pending winter storms or hurricanes, wild land fire conditions, heat waves or river floods enable the public and emergency managers to plan effective response strategies. Warnings for high impact, rapidly evolving hazards such as solar storms, tornadoes, tsunamis, flash floods or volcanic eruptions enable the public to get out of harm's way and mitigate preventable loss. Outreach, education and collaboration activities allow partners and communities to understand and manage risk, formulate emergency response plans and promote community resiliency and public safety. AFS encompasses an end-to-end capability from gathering requirements to collaborating on science and application innovations to policy development to education and outreach to the provision of service to the Nation. AFS products rely upon the Dissemination PPA for distribution to the citizens including emergency managers and the broader Weather Enterprise, upon the STI PPA for the transition of innovations into operations, and upon the Facilities PPA to support improvements to AFS facilities.

IDSS is the foundational concept of NWS' WRN. Rather than developing and transmitting a suite of products at fixed times and expecting stakeholders to fully understand and take appropriate action; IDSS changes the paradigm so information users drive the update frequency and value-added meaning of the product. Moreover, as relationships develop with government partners at all levels, key decision thresholds are provided to the WFOs in the form of "Impacts Catalogs" so NWS staff can provide increased lead times for weather conditions that generate the highest impacts. IDSS also enhances decision making and public safety by providing forecasters greater flexibility to work with key governmental partners and give first hand support by being embedded within emergency operations centers. NWS forecasters receive additional training to become Emergency Response Specialists (ERS) which permits on-scene support at HAZMAT incidents and to support rescue operations in the wake of major disasters.

To achieve these goals, AFS maintains the following programs:

Weather and Climate Services and Warnings provide real-time meteorological and climatological data to support NWS forecast operations. To achieve this requirement, NWS operates WFOs and other field offices within the continental United States, Alaska, Hawaii, and U.S. territories.

- WFOs are responsible for issuing warnings, advisories, statements, and forecasts for their geographic area of responsibility. These forecasts include local public, marine, aviation, fire

and hydrology. WFOs also issue warnings for severe thunderstorms, flash floods and tornadoes. WFO staff gathers weather observations and climate data for their assigned area which, in many locations, includes the launching of weather balloons. Additionally, NWS's forecasters issue daily and monthly climate reports, providing localized information about temperature and precipitation records and extreme events such as droughts. WFOs also control the broadcasts of weather information on the NOAA Weather Radio All Hazards stations, provide weather spotter training to the community and foster close ties with both the media and the emergency management community. WFO operations run 24 hours a day, seven days a week at 122 locations.

- Weather Service Offices (WSO) are located at 18 locations within Alaska and Hawaii and provide expert hydro-meteorological data in support of local, regional, national, and global weather, hydrologic, climatic, and warning programs. WSOs support the mission of their associated WFO through value added public service, education, and outreach. They differ from WFOs in that they do not issue forecasts and are responsible primarily for observations and data collection and are not run 24 hours a day.

National Centers provides specialized services through NCEP. Each National Center depends on the observational infrastructure, data assimilation systems, numeric modeling capability, and application of model output statistics to produce both foundational and value-added forecast guidance products for NWS field offices and direct users. The National Centers provide an integrated suite of weather and environmental forecast guidance from the short-term through seasonal, inter-annual, decadal, and centennial time frames and specific tailored forecast products. The National Centers form the backbone of NWS' WRN service capability by providing expert analysis and prediction services to the local weather forecast office infrastructure. Forecasters use this guidance as the basis for consistent local forecast products, advisories and warnings. The seven National Centers within the AFS PPA include:

- Aviation Weather Center (AWC) is the mechanism by which the United States disseminates its weather forecasts and warnings to the aviation community under an international agreement through the International Civil Aviation Organization. The AWC also produces guidance products for use by WFOs in support of the airport terminal forecast function and coordinates with major airlines in the creation of enroute hazards products and forecasts.
- Climate Prediction Center (CPC) provides a broad range of climate products and services related to climate monitoring, short-term climate outlooks, and information on the impacts of climate patterns on the Nation. CPC monitors for patterns that may signal drought, excessive rainfall and for periods of temperature extremes such as prolonged heat waves. These climate services are available for users in government, the public and private industry and are particularly important for water managers and agriculture.
- National Hurricane Center (NHC) produces advisories, watches, and warnings for tropical cyclones in the North Atlantic and eastern North Pacific oceans, the Caribbean Sea, and the Gulf of Mexico, including the portions of the U.S. coastline threatened by such storms. The NHC functions both to provide guidance, coordination, and tropical weather and storm surge expertise to WFO forecasters and to serve users of centrally generated products. NHC experts play a major role in outreach via close relationships with coastal emergency managers and FEMA.
- Ocean Prediction Center (OPC) discharges domestic and international meteorological products to marine interests including weather and sea state warnings and forecasts for U.S. offshore waters and high seas regions of the Northern Hemisphere. The OPC also provides guidance for WFOs with coastal waters forecast responsibilities, which extend out to nearly 100 nautical miles.

- Space Weather Prediction Center (SWPC) provides real-time monitoring and forecasting of solar and geophysical events and develops techniques for forecasting solar and geophysical disturbances. The SWPC operates the national civilian space weather operations center. Forecasts, alerts, and warnings are provided to customers on a daily 24 hour basis (24x7) and are used extensively by the Nation's electric grid operators, commercial satellite companies and airlines that have transpolar routes.
- Storm Prediction Center (SPC) provides timely and accurate forecasts and watches for severe thunderstorms and tornadoes over the contiguous United States. The SPC also monitors and provides guidance on the occurrence of heavy rain, heavy snow, and fire weather potential and issues specific products for those hazards.
- Weather Prediction Center (WPC) is responsible for preparing a variety of analysis and national guidance products in support of the NWS mission. WPC forecasters track and predict the movement of weather systems, ranging from fair weather conditions to the development and movement of winter storms. WPC predicts rainfall and snowfall coverage and accumulation amounts for the Nation out to 10 days, and generates foundational general weather information that is used extensively by the weather enterprise, the military, international interests, and NWS WFOs and RFCs.

Hydrological Services and Warnings provides hydrological data to support NWS forecast operations through its RFCs and provides state-of-the-science hydrologic analysis, forecast information and decision support services to address the Nation's growing water resources challenges and is headquartered at the National Water Center (NWC). While not part of NCEP, the NWC serves as a cornerstone for Integrated Water Resources Science and Services (IWRSS) and is a central hub to integrate and advance national and regional hydrologic field operations and services.

- RFCs provide daily river stage data, river forecasts and flash flood guidance for water management. Some RFCs, especially those in mountainous regions, also provide seasonal snow pack and peak river flow forecasts. These forecasts are used by a wide range of users, including those in agriculture, hydroelectric dam operation, and water supply resources. The information is also the basis for river flood and flash flood warnings, watches, and advisories issued by the WFOs that emphasize flooding impacts depending on geographic area, land use, time of the year, and other factors. NWS operates 13 RFCs.
- IWRSS is a new business model for interagency collaboration consisting of a consortium of Federal agencies including of NOAA, the U.S. Army Corps of Engineers (USACE), and the U.S. Geological Survey (USGS) with complementary missions in water science, observation, management and prediction. IWRSS' overarching objective is to enable a broad, integrative national water resources information system to serve as a reliable and authoritative means for adaptive water-related planning, preparedness and response activities.
- In partnership with field offices and Federal partners, the NWC will generate new and enhanced water resources information to better inform and enable routine high-value and high-impact decision-making across a broad range of water-management and emergency-management sectors.

Tsunami Program provides reliable tsunami warnings and statements for the Pacific and Arctic regions and for the Atlantic Ocean, Caribbean Sea, and Gulf of Mexico regions. NWS Tsunami Program addresses national tsunami priorities, promotes community resilience, and coordinates with national and international partners to improve warnings and mitigate the loss of life and damage to property as a result of tsunamis. NWS Tsunami Program is supported by the Pacific Tsunami Warning Center (PTWC) in Hawaii and the National Tsunami Warning Center (NTWC) in Alaska. Duties are as follows:

- Develop new processes and techniques to improve response times, tsunami onset forecast accuracy, and message content to residents in the area-of-responsibility;
- Issue tsunami watches and warnings for all U.S. communities at risk and for international areas by agreement. NWS collects and analyzes observational data from an international network of seismological observatories and sea level observing stations that operate on a cooperative basis; and
- Increase community preparedness and public tsunami education through the TsunamiReady™ program and outreach.

Pacific Island Compact is part of the U.S. Compact of Free Association (COFA) with the Republic of the Marshall Islands (RMI), the Federated States of Micronesia (FSM), and the Republic of Palau (ROP) to provide basic government and commerce services including weather services to these island nations. The Compact provides the necessary funding to support the NWS WSOs and associated weather warning, forecast, and observation services for these islands including WSO Majuro, RMI; WSOs Pohnpei, Yap and Chuuk of the FSM, and WSO Koror of ROP. This continued investment will also preserve critical weather observation infrastructure and services in the Pacific necessary to support core NOAA mission responsibilities in the Pacific such as aviation, typhoon, and marine forecasts; climate monitoring; and support to U.S. Navy operations.

Schedule and Milestones:

FY 2016 – 2020

- Operate national network of WFOs that provide 24x7 weather surveillance, forecast and warning services
- Operate national network of RFCs that provide river stage, flow and flood guidance
- Operate the NCEP service centers that monitor the tropics, warn of space weather hazards, predicts tornadoes, provides outlooks for climate events and develops the foundational data sets that are used both domestically and internationally for commerce, the military and the general population
- Operate the NWC to support water management across the Nation
- Train and certify Incident Meteorologists (IMETs) for support of wild land fire decision making
- Provide IDSS to core governmental partners during routine and high impact events
- Embed NWS meteorologists within all FAA Air Traffic Control Centers and FAA Command Center to provide IDSS to traffic managers in support of flight safety
- Operate Tsunami Warning Centers to monitor and predict the development and onset of tsunamis along the Nation's coasts
- Provide weather support to the Nations of the Pacific Island Compact

FY 2017

- Begin full operations capability of Whole Atmosphere Model (WAM)

FY 2018

- Begin SWPC generated regional nowcasts and short term forecasts of ionospheric disturbances

Deliverables:

- Operations and maintenance of 122 WFOs
- Operations and maintenance of 13 RFCs
- Operations and maintenance of 7 National Centers
- Operations and maintenance of 2 Tsunami Warning Centers
- Operations and maintenance of the NWC

- Operations and maintenance of field operational support from National Headquarters
- Operations and maintenance of 18 OCONUS Weather Service Offices that provide weather warnings, forecasts, and observation services to participants in the Pacific Island Compact and remote portions of Alaska
- Improved forecasts of space weather conditions
- Improved forecasts of hurricanes, blizzards, heat waves and severe storms
- Continuity of timely and accurate weather and water forecasts and warnings
- Aviation weather forecasts for all identified airports and air routes
- Distance Learning Aviation Course modules
- Deployments of IMETs to support decision makers at wild land fires
- Continued support of StormReady and TsunamiReady Communities

DISSEMINATION

The ability to communicate warnings and forecasts to the American public is essential to protect property and save lives. To be effective, NWS requires a sophisticated suite of communications systems capable of meeting the varied customer needs in a timely, reliable and authoritative manner. The Dissemination PPA manages the communications technology required by NWS for collecting, tailoring, and distribution of data and products. The Dissemination PPA collects and distributes data products within NWS and to the citizens including emergency managers and other Federal and private end-users. The Dissemination PPA also transmits experimental and developmental mode products, thereby supporting and enabling research to operations (R2O) for the STI and AFS PPAs. Dissemination is the provision of information in a variety of formats through multiple channels such as satellite broadcast and terrestrial networks, World Wide Web, and radio that is tailored for the Weather Enterprise and the public. Current major systems include the NWS Telecommunications Gateway (NWSTG), NOAA Weather Radio (NWR), the Emergency Managers Weather Information Network (EMWIN), and an extensive network interconnecting NWS sites to one another and to NWS partners. Dissemination ensures the timely and reliable delivery of data needed by NWS systems, offices and stakeholders.

NWS is restructuring its dissemination capabilities using an integrated, enterprise approach to ensure a scalable, extensible, and reliable system using industry best practices. This change is required to continue the timely delivery of critical environmental data and products, provide capacity for substantial increases in observing and modeling systems and other data volumes, and to meet the demands of an evolving service delivery paradigm.

To ensure a Weather-Ready Nation and optimize the delivery of scalable and agile dissemination capabilities, the NWS organized this PPA around infrastructure, networks and other warning-delivery services.

In general, the Dissemination PPA will:

- Operate NWS' information technology (IT) dissemination infrastructure and services;
- Identify NWS' dissemination requirements and gaps;
- Analyze NWS' system capabilities;
- Build a scalable NWS dissemination architecture, consistent with and part of the emerging NOAA enterprise architecture; and
- Maintain a strategy to maximize effectiveness while minimizing cost.

To achieve these goals, Dissemination maintains the following programs:

Dissemination IT Infrastructure and Virtualized Application Services provides a scalable, robust, secure and commonly shared dissemination IT infrastructure for NWS and to other NOAA and Federal partners to consolidate and host software applications and systems.

- The NWSTG is the Nation's hub for the collection and distribution of weather data and products. NWSTG provides national and global real-time exchange services using automated communication resources to collect and distribute a wide variety of environmental data such as observations, analysis, and forecast products. These time-perishable data products are distributed to ensure the fastest availability of the information.
- Next Generation Air Transportation System (NextGen) IT services will provide enhanced, flexible access to observational weather data, hazardous-weather information, and other weather forecast products required for integration into an air traffic management system. This investment supports aviation industry and stakeholders including the FAA, International Civil Aviation Organization (ICAO), and the World Meteorological Organization (WMO).

Terrestrial and Satellite Networking Services provides the capabilities to ensure the required networking capacity and reliability to deliver weather critical data. NWS strives to promote commerce, and protection of life and property goals, by providing environmental data supporting society's ability to take preventive and divertive actions so that people remain safe; less damage is done to communities, businesses, and the environment; and economic productivity is maximized. NWS operates and maintains critical terrestrial and satellite networking capabilities.

- NWS manages a distributed network of terrestrial telecommunication circuits, satellite communications space segments, wireless, broadband and wireless capabilities that span the Nation, including the Pacific and Alaskan regions, delivering essential NOAA data.
- Satellite Broadcast Network (SBN) transmits critical weather data from satellites, models, observations systems and other sources, to all field office forecasters and external partners across the northwestern hemisphere. The SBN offers the capability to provide internal and external users with open access to much of NOAA's real-time environmental data.

Weather Information Distribution Services provides the capabilities to communicate weather related warnings directly to emergency managers and the public. NWS operates several weather warning services systems, most notably NOAA Weather Radio (NWR). NWR was designed to be used as a reliable means of communicating weather related warnings directly to the public. The existing infrastructure of NWR has tremendous potential for use communicating warnings and information about non-weather related hazards and emergencies. NWR infrastructure consists of over 1,000 existing broadcast stations; broadcast coverage that reaches 98 percent of the Nation's population; and the ability to deliver the broadcast message to individuals monitoring their own NWR receivers. In addition, NWR signals enter the Emergency Alert System monitored by television and radio license holders enabling a second path that reaches millions of listeners and viewers.

- NWR is the only NWS dissemination system capable of reaching individuals at nominal cost (individual purchase of NOAA weather radio) and is the only system the Federal Communications Commission mandates that broadcast media outlets monitor as a source of public safety announcements.
- EMWIN provides the emergency management community with access to a set of NWS warnings, watches, forecasts, and other products.
- NOAA Weather Wire Service (NWWS) is a satellite data collection and dissemination system which provides state and Federal government, commercial users, media, and private citizens with timely delivery of meteorological, hydrological, climatological, and geophysical

information. The vast majority of NWS products are weather and hydrologic forecasts and warnings issued around the clock from NWS Forecast Offices.

NWS is also leveraging Geospatial and Web Services to disseminate and integrate NWS critical weather data. When considering the impact of severe events such as hurricanes or winter storms, climate, water and weather information needs to be analyzed and then linked with details about the people, properties, and infrastructure that can be or will be affected. With many decision makers using Geographic Information System (GIS) as an analytical tool to link different types of data, identify spatial relationships and analyze patterns, NWS uses GIS to strengthen its capacities and delivery of relevant products and services.

Schedule and Milestones:

FY 2016 – 2020

- Maintain NWR and NWSTG Services
- Execute approved Roadmap for future Weather Distribution Services
- Operate and maintain NWS Network bandwidth/reliability

FY 2016

- Augment Dissemination Infrastructure to support requirements
- Operate test and evaluation of NextGen IT/Web Services infrastructure and capabilities for NWS Full Operating Capability at end of FY 2016 to support the FAA's NextGen Initial Operating Capability milestone
- Full Operating Capability for dissemination of Geospatial Services
- Readiness of NWS dissemination systems for Geostationary Operational Environmental Satellite R (GOES-R) Series and new model products.

FY 2017

- Augment Dissemination Infrastructure to support requirements
- Optimize NextGen IT Services to accommodate additional data providers, users and increase data throughput
- Fully integrated NWS Geospatial Services
- Readiness of NWS dissemination systems for GOES-S and Joint Polar Satellite System-1 (JPSS-1) products

FY 2018

- Augment Dissemination Infrastructure to support requirements
- Optimize NextGen IT Services to accommodate additional data providers, users and increase data throughput
- Maintain/Enhance Geospatial Services Enterprise

FY 2019

- Conduct (first year) of five year refresh of Dissemination Infrastructure hardware
- Optimize NextGen IT Services to accommodate additional data providers, users and increase data throughput
- Maintain/Enhance Geospatial Services Enterprise

FY 2020

- Conduct (second year) of five year refresh of Dissemination Infrastructure hardware
- Maintain NextGen IT Services to accommodate additional data providers, users and increase data throughput
- Maintain/Enhance Geospatial Services Enterprise

Deliverables:

- NWSTG functionality and continued 24x7 support at 99.8 percent availability
- NWR service availability at 96 percent
- Integration of enhanced weather data into air traffic management system
- 24x7 support of SBN
- Operational Terrestrial and Satellite Networking Services

SCIENCE AND TECHNOLOGY INTEGRATION

Integrated and modernized NWS services are needed to meet society's growing demands for better environmental information to safeguard life and protect livelihoods. To enable NWS to benefit from advances in science and technology and synergize activities, NWS consolidated its distributed research and development functions into a single PPA. NWS' STI PPA leverages the entire weather enterprise including users and research communities, partner agencies, and industry to provide state-of-the-science weather forecast guidance for the Nation. This includes engaging partners in outreach efforts, supporting targeted development efforts, improving a suite of forecast guidance models and post-processing, continuously training workforce on scientific advances, and infusing new science into operations.

NWS works with core partners to identify mission requirements which enable NWS to prioritize its research to operations (R2O) transition activities from outreach to targeted development. Scientific and technological advancements in atmosphere, ocean, coasts and climate predictions from research communities are continuously adopted into NWS to improve services. The STI PPA identifies and transfers new science concepts and techniques aimed at accelerating the transition of scientific and technical advancements into new and improved NWS operational warning, forecast and decision support services, thus enabling the NWS vision to build a Weather-Ready Nation.

Key actions of the STI PPA include:

- Accelerate applications of advanced observing capabilities including data assimilation;
- Develop advanced operational numerical forecast models and applications of high performance computing capabilities;
- Develop the next generation warning and forecast guidance paradigm, taking into account users perspectives about warning and forecast information;
- Use test beds and proving grounds to enable the research community to leverage operational infrastructure to conduct research, thus accelerating R2O transition;
- Continue development of advanced training approaches to enable the workforce to keep pace with advanced science and technologies; and
- Rapidly develop solutions to address regional-local forecasts issues through partnership with the university research community.

To achieve these goals, STI maintains the following programs:

Weather-Ready Nation is a nationwide initiative to build community resilience in the face of increasing vulnerability to extreme weather, water and climate events. STI focuses on identifying science and technology advances that will enable NWS to better serve our increasingly weather-sensitive Nation and transition them into new and improved warning and forecast services. WRN empowers emergency managers, first responders, government officials, businesses, and the public to make faster, smarter decisions to save lives and protect livelihoods. Key STI actions that enable implementation of the WRN roadmap include:

- Develop, transition, and improve advanced forecast tools, techniques, service products and next generation warning and forecast paradigms to enhance NWS' national regional and local warning, forecast, and guidance services such as hurricane, tornado, wild fire, winter storm, climate variations, aviation, marine and space weather hazards;
- Incorporate and integrate social science into forecasting process to develop more effective decision support capabilities, improving the effectiveness of warnings and forecasts, and better conveying forecast risk and uncertainty;
- Develop skillful, high-resolution probabilistic weather information consistent across space and time for all National Airspace System managers to support safe air traffic operations. Weather causes 70 percent of all air traffic delays greater than 15 minutes. This effort is through the NextGen Weather Program and includes improvements to the science behind aviation weather predictions and development of new methods to evaluate the performance of aviation and other NWS forecasts;
- Extend warning and forecast lead times for tornado, hurricane, storm surge, fire weather, and winter storms with increased certainty and increasing confidence through the use of improved model guidance, tools and data sets. Develop and improve models, tools and data sets to forecast and monitor in real-time for climate variations from weeks to years;
- Improve space weather warning and forecast for geomagnetic and radiation storms and ionospheric disturbances to protect the reliability and resiliency of the Nation's electric power system, satellite navigation and telecommunication infrastructure, and support aviation and space flight safety; and
- Develop and evaluate national air quality forecast models to provide national pollutant forecast information for states, local communities, commercial sectors, the Environmental Protection Agency, and the Department of State.

Operational Environmental Prediction Modeling Suite is the foundation for all warning, forecast and decision support services at all levels (national, regional and local). The Environmental Modeling Center (EMC) within the STI PPA develops, enhances, and maintains complex software of numerical weather, ocean, climate, sea ice, and coastal prediction models and data assimilation systems that span the globe. These forecast systems are highly leveraged and underpin all NOAA forecast capabilities. The operational modeling suite provides the basic numerical guidance that NWS operational forecasters rely on in making weather, water, and climate forecasts warnings, and decision support service products.

- EMC integrates advancements of environmental prediction modeling research and development at universities and research laboratories, and incorporates them into advanced NWS operational models.
- EMC also collaborate with partners within NOAA and with other Federal agencies to conduct studies to validate observing requirements and data impacts for existing and new observing platforms and technologies such as satellites and radar.

Improving Effectiveness of Warning and Forecasts is a program aimed at accelerating the transition of advanced modeling research into the operational numerical weather prediction suite to meet rapidly evolving national prediction requirements for high impact weather. This program is focused on improving lead-times and accuracy of severe weather associated with hurricanes and other severe weather forecasts by leveraging the Hurricane Forecast Improvement Project (HFIP) and extending the effort to medium and extended range forecasts of high impact weather through building and deploying the Next Generation Global Prediction System (NGGPS).

- HFIP is improving the accuracy and reliability of hurricane track and intensity forecasts to reduce unnecessary evacuations. HFIP will extend lead time and increasing certainty of hurricane forecasts, including associated storm surge. HFIP also focuses on advanced data

assimilation and improved global atmospheric ocean models, which underpin forecast systems for all severe weather. The advanced prediction capability produced by HFIP is an integral part of the future NGGPS and will also be applied to locally severe weather like tornados and other damaging winds.

- The NGGPS will form the backbone of NOAA's future operational prediction capability meeting the public's evolving needs for more accurate, more specific, longer lead time weather forecasts. The NGGPS will result in significant advancements for warning and forecasts skill across multiple service areas. Targeted improvements include: advanced data assimilation methods; data impact studies of future observing systems such as the next-generation satellites to enable rapid incorporation of future observing system data while guiding observing systems strategies and requirements; a software architecture that maximizes the benefit from high performance computing (HPC) and enables quicker transition of internal and external research to operations; investigations into effective use of emerging HPC technologies; and a community-based model infrastructure which will streamline the incorporation of proven research advances into operations.

Hydrology and Water Resource Programs leverage NOAA science and service partnerships for atmosphere, watersheds, estuaries and oceans to improve and integrate water resource prediction modeling capabilities. NWS' Hydrology Laboratory conducts studies, investigations and analyses leading to the application of new scientific and computer technologies for hydrologic forecasting and related water resources problems.

- NWS transitions advances in atmosphere, watersheds, estuaries and ocean modeling and data assimilation science and technology into operational hydrologic and water resource forecast capability that provides integrated decision support tools that offers a seamless suite of treetop-to-bedrock, summit-to-sea forecasts.
- Through partnerships under the auspices of the Integrated Water Resources Science and Services (IWRSS) Consortium, NWS is developing a new suite of high-resolution forecasts of stream flow, soil moisture, soil temperature and other variables directly related to watershed conditions to enable monitoring and forecasting hydrologic conditions from floods to droughts.

Training Infrastructure is critical to ensure the current and future workforce is prepared for WRN. Effective training will lead to better integration of new models and transition of science and technology into operations leading to improved service to the Nation. The NWS workforce must remain agile and flexible to meet core partner needs. NWS will use a blended learning approach, including online courses, webinars, and residence training.

- Implementation of these training initiatives requires new and enhanced methods and technologies for training delivery, such as simulations and on-demand training integrated into applications and other systems.
- Concepts defined in the WRN roadmap include greater interdisciplinary training, deeper understanding of the scientific method and research design, and additional education on communicating science effectively.
- Identify and address local training needs, facilitate professional development, and address individual strengths and weaknesses of the local forecast staff; and
- Ensure local operations and management teams are fully proficient and knowledgeable in protocols, tools, forecast and warning operations for delivery of effective Impact-based Decision Support Services.

Strengthen Field Operations through continuing infusion of science and technology is critical for improving services and ensuring the current and future workforce is prepared to meet the

requirements of a WRN. NWS must maintain, coordinate, and manage a high level of competency in local science and training expertise for its field operations. These actions include:

- Centrally manage national and regional implementation of research to operations transition at the local level including applications that improving model guidance;
- Maintain local science and training expertise through the Science and Operations Officers (SOO) and the Development and Operations Hydrologists (DOH) to lead coordinated improvements of operations through adopting new science and technology by the forecasting staff, and addressing local forecast and warning issues;
- Sponsor collaborative research projects through the Collaborative Science, Technology, and Applied Research (CSTAR) Program to identify new science concepts and techniques for improvement of NWS services;
- Leverage testbeds and operations proving grounds to establish a centralized development and testing environment (CDTE) enabling develop and test applications in real time, including innovations resulted from the CSTART grants, and providing access to high volume observations and full suite of model output data sets; and
- Provide operational platforms for broad research and development community across NWS, academia, core partners, and the weather enterprise to conduct demonstration, simulation, verification, and validation of new science and service capabilities.

Schedule and Milestones:

FY 2016 – 2020

- Conduct testing, demonstration and validation for new science and service capability through testbeds and proving grounds
- Implement model upgrades routinely
- Improve weather model and post processing guidance
- Update product suite based on customer requirements
- Conduct engagements with key stakeholders
- Support the Comprehensive nuclear Test Ban Treaty Organization (CTBTO) compliance

FY 2016

- Enhance ensemble and probabilistic modeling techniques for aviation parameters
- Initiate Development Testing for coupled global prediction system
- Demonstrate increased skill (7 day skill extended to 9 days) for coupled global ocean-atmosphere-ice-wave system demonstrated
- Upgrade Localized Aviation Model Output Statistical Products (LAMP) guidance
- Implement Aviation Forecast Verification Tool
- Begin implementation of results from workforce analysis

FY 2017

- Re-architect and re-engineer component models for efficient transfer to fine grain computing platforms
- Implement Multi Radar and Multi-sensor (MRMS) and Grid-Point Statistical Interpolation (GSI) based data assimilation upgrade for the High-Resolution Rapid Refresh (HRRR)
- Begin implementation of results from workforce analysis

FY 2018

- Implement Next Generation Global Modeling System, Version 1.0
- Implement operational coupled atmosphere-ocean-wave-sea ice forecast system
- Implement high resolution, ensemble storm surge model
- Begin implementation of results from workforce analysis

FY 2019

- Implement operational seasonal Arctic sea ice outlook
- Implement version 3 of the operational Climate Forecast System
- Begin implementation of results from workforce analysis

FY 2020

- Complete transition of Operational Models to next-generation high performance computing systems
- Initiate operational probability-based forecasts of high impact weather for extended ranges (weeks 3 and 4)
- Begin implementation of results from workforce analysis

Deliverables:

- Experimental real-time forecast guidance from Hurricane Forecast System on the HFIP R&D Computing
- Extended model guidance out to two weeks and longer into the future
- Advanced, physically based, high-resolution hydrologic modeling data assimilation capability
- Probabilistic hydrologic forecasts for assessing river level and flood risks
- Continuous improvements to NOAA's suite operational forecast models
- New and improved modeling techniques, evaluated by the Developmental Testing Center, delivered to NWS for incorporation in the Operational Modeling Suite
- Annual upgrades to operational Data Assimilation System
- Annual upgrades to NEMS infrastructure
- Annual upgrades to operational NOAA Hurricane Forecast System
- Upgraded ocean, atmosphere, sea ice, land surface, wave component models
- Coupled global system using re-engineered system component models
- Improved utilization of HPC resources and cost effective implementation of model improvements
- Agile HPC environment with quicker operational transition of R&D efforts
- Upgraded operational storm surge warning service products (e.g., inundation map)
- Upgraded probabilistic storm surge guidance
- Coupled ocean-atmosphere-wave-sea ice forecast system for Arctic ocean
- Operational seasonal sea ice outlook guidance products for Arctic Ocean
- Forecaster applications (tools, methodologies, datasets) of near real time data products (e.g., ocean surface wind, wave, temperature, color) from research ocean remote sensing satellites
- Next generation severe weather warning paradigm
- Week-2 to seasonal climate outlook tools/products for local decision support services
- Operational geospace model for space weather forecast guidance
- Comprehensive analyses of workforce
- Evaluation of NWS testing/demonstration plans and results

PROGRAM CHANGES FOR FY 2016:

Observations: National Reconditioning Center/National Logistics Supply Center: (Base Funding: \$1,703,000 and 0 FTE; Program Change: \$853,000 and 0 FTE): NOAA requests an increase of \$853,000 and 0 FTE for a total of \$2,556,000 and 0 FTE to cover the National Weather Service (NWS) National Reconditioning Center (NRC) and National Logistics Support Center (NLSC) lease increase.

Proposed Action:

NWS' NRC and NLSC currently operate out of the GSA Public Building Service (PBS) Bannister Complex in Kansas City, Missouri (MO). GSA has announced closure of the Bannister Complex at the end of 2016, necessitating the relocation of NRC/NLSC. GSA does not have existing, suitable federally owned space available within the Kansas City, Missouri area to support NRC/NLSC operations and, as a result has awarded a commercial lease to fulfill the NRC/NLSC space requirements and anticipates obtaining occupancy by October 2015.

NWS was able to reduce its floor space requirements by 24 percent by evaluating requirements and finding efficiencies in more tightly coordinated operations. However the new facility lease is \$853,000 higher than the current Bannister Complex lease of \$1,703,000. The new GSA PBS commercial full year lease will be \$2,556,000 in FY 2016, including the GSA PBS fee. The new location is also located in Kansas City, MO and is 7.5 miles from the Bannister Complex.

Investment in NRC/NLSC mitigates operational risks as NRC/NLSC is needed for the continuity of observational systems required for weather forecast and warning operations to continue to provide year round, 24x7 operational support to the NWS mission. Key NWS observational infrastructure such as NEXRAD and ASOS depend on the parts coming from NRC/NLSC to maintain lead time and accuracy of its performance needed to support weather forecast activities.

Statement of Need and Economic Benefits:

The NRC/NLSC is the hub that provides mission critical components through which NWS equipment and Tri-Agency Federal Aviation Administration and Department of Defense equipment pass for repair, quality inspection, warehousing, and distribution. The NWS mission requires 24/7, 365 day operational support which is currently provide by NLSC/NRC. The total capital inventory managed in this facility is valued at over \$130 million. NLSC manages over 12,000 stock items and ships an average of 130 line items daily to over 14,500 customer sites world-wide. NRC makes over 12,000 repairs each year to critical components of the weather enterprise infrastructure including components of observation systems.

Resource Assessment:

Current resources fund the existing lease for NRC/NLSC at the Bannister Complex. The Observations PPA does not have the resources to fund the increased lease delta without impacting observational system availability such as radiosondes, NEXRAD, and ASOS that the NWS operations mission depends.

Schedule and Milestones:

FY 2016

- Begin lease increase

Deliverables:

- Continuity of logistical support of NWS observational systems

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: National Weather Service
Sub-program: Observations
Program Change: National Reconditioning Center/ National Logistics Supply Center

Object Class		FY 2016 Increase	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$67,120
11.3	Other than full-time permanent	0	100
11.5	Other personnel compensation	0	2,131
11.6	Leave Surcharge Full-Time	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	<u>0</u>	<u>69,351</u>
12	Civilian personnel benefits	0	20,302
13	Benefits for former personnel	0	37
21	Travel and transportation of persons	0	1,229
22	Transportation of things	0	2,114
23.1	Rental payments to GSA	0	2,040
23.2	Rental Payments to others	853	2,979
23.3	Communications, utilities and misc charges	0	14,539
24	Printing and reproduction	0	27
25.1	Advisory and assistance services	0	33,886
25.2	Other services	0	30,392
25.3	Purchases of goods & services from Gov't accounts	0	2,000
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	715
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	28,491
31	Equipment	0	3,179
32	Lands and structures	0	1
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	2,076
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	4
44	Refunds	0	0
99	Total obligations	<u>853</u>	<u>213,362</u>

Due to financial system limitations, the object class detail for the Program reflects the Observations PPA.

Observations: Radiosonde Supply: (Base Funding: 12,042,000 and 0 FTE; Program Change: \$1,014,000 and 0 FTE): NOAA requests an increase of \$1,014,000 for a total of \$13,056,000 to fully fund the acquisition cost of radiosondes for twice daily launches at all 102 NWS Upper Air (UA) observing stations in accordance with international conventions.

Proposed Actions:

The Nation's UA network provides over 78,000 atmospheric profiles (wind, humidity, temperature, pressure and altitude) per year from ground level to up to 60,000 feet as required for the current NWS UA operations concept and modeling requirements. The network includes 92 NWS-operated sites plus 10 additional UA sites in the Caribbean Hurricane Upper Air System (CHUAS). This network of UA station enables unmatched ability to detect dangerous wind shear, which is hazardous to aviation and critical to hurricane formation; and enables much improved ability to define the jet stream core.

The radiosonde procurements were partially funded by the Observations PAC account during the deployment of the Radiosonde Replacement System (RRS). This increase returns RRS radiosonde procurement to steady-state operations, which will be maintained in the Observation ORF account, as NWS has requested a transfer of these funds from the Observations PAC account into the Observation ORF account to consolidate radiosonde acquisitions. The Consolidated and Further Continuing Appropriations Act, 2015 reduced the Observations PAC account by \$1,014,000 below the President's requested level. To implement this reduction during FY 2015, NWS reduced its radiosonde on-hand supply from a 120 day down to a 90 day supply. A 120 day on-hand supply is required to minimize risks with the associated supply chain. This request fully restores the funding required to conduct twice daily launches at all 102 UA observing stations.

Statement of Need and Economic Benefits:

The UA profile data received from radiosondes serve as one of the principal data sources for NWS weather prediction models, run by NCEP, supporting days 2, 7, and 14 severe storm, aviation and marine forecasts and warnings. Radiosonde data are also used to inform a large spectrum of activities, from modeling the dispersion of hazardous materials and pollutants in the atmosphere to the understanding the effects of freezing precipitation on aircrafts.

NOAA's upper-air network (radiosondes, wind profilers, Next Generation Weather Radars, and in-flight data sensors from commercial aircraft) provides the foundation for all short-term weather predictions; the quality, timeliness, and availability of observations from this composite network directly affect NOAA's ability to meet its protection of life and property mission. Studies¹ using NASA's GEOS-5 global numerical weather prediction model showed radiosonde observations have the most significant impact on the 24 hour weather forecast and UA radiosonde profiles are a key element to the calibration of remote sensing systems, including all NOAA weather observation satellites. Due to their multiple measurement capability and their importance for satellite calibration, the UA observations provided by the NOAA's modernized UA radiosonde network are critical to Numerical Weather Prediction (NWP) modeling and remain the backbone of the Nation's global observing system.

Resource Assessment:

Current resource assessment is provided in the Observations narrative.

¹ Rienecker, et al., 2008 in "The GEOS-5 Data Assimilation System - Documentation of Versions 5.0.1, 5.1.0, and 5.2.0," NASA Technical Report Series on Global Modeling and Data Assimilation, 27

Schedule and Milestones:

FY 2016-2020

- Launching GPS radiosondes twice daily at 102 sites

Deliverables:

- Improved forecasts for severe storms, aviation and marine, and climate applications

Performance Goals and Measurement Data:

Performance Measure:	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
Number of GPS UA Launches							
With Increase	N/A	N/A	78,183	78,183	78,183	78,183	78,183
Without Increase	78,183	78,183	71,846	71,846	71,846	71,846	71,846
Description: Reduced frequency of radiosonde launches will have direct relationship to accuracy of NOAA numerical weather modeling suite. Lose of radiosonde launches during critical weather will further magnify impacts to numerical model outputs.							

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: National Weather Service
Sub-program: Observations
Program Change: Radiosonde Supply

Object Class	FY 2016 Increase	FY 2016 Total Program
11 Personnel compensation		
11.1 Full-time permanent	\$0	\$67,120
11.3 Other than full-time permanent	0	100
11.5 Other personnel compensation	0	2,131
11.6 Leave Surcharge Full-Time	0	0
11.8 Special personnel services payments	0	0
11.9 Total personnel compensation	0	69,351
12 Civilian personnel benefits	0	20,302
13 Benefits for former personnel	0	37
21 Travel and transportation of persons	0	1,229
22 Transportation of things	0	2,114
23.1 Rental payments to GSA	0	2,040
23.2 Rental Payments to others	0	2,126
23.3 Communications, utilities and misc charges	0	14,539
24 Printing and reproduction	0	27
25.1 Advisory and assistance services	0	33,886
25.2 Other services	0	30,392
25.3 Purchases of goods & services from Gov't	0	2,000
25.4 Operation and maintenance of facilities	0	0
25.5 Research and development contracts	0	715
25.6 Medical care	0	0
25.7 Operation and maintenance of equipment	0	0
25.8 Subsistence and support of persons	0	0
26 Supplies and materials	1,014	29,505
31 Equipment	0	3,179
32 Lands and structures	0	1
33 Investments and loans	0	0
41 Grants, subsidies and contributions	0	2,076
42 Insurance claims and indemnities	0	0
43 Interest and dividends	0	4
44 Refunds	0	0
99 Total obligations	1,014	213,523

Due to financial system limitations, the object class detail for the Program reflects the Observations PPA.

Observations and Science & Technology Integration: Space Weather Observations and Numerical Model Transition to Operations: (Base Funding: \$2,400,000 and 0 FTE; Program change: +\$2,500,000 and +0 FTE): NOAA requests an increase of \$2,500,000 and 0 FTE for a total of \$4,900,000 and 0 FTE to support Research to Operations (R2O) and activities for space weather research observation systems and numerical model development.

Proposed Actions:

This request enables NOAA to effectively utilize existing solar observations while developing an expanded suite of space weather numerical models. NOAA will invest \$1,000,000 to support operations and maintenance (O&M) of the National Solar Observatory’s (NSO) Global Oscillation Network Group (GONG) solar observatories. GONG consists of six ground-based observatories strategically placed around the globe, so that at least one site has the opportunity to observe the Sun at all times, and a centralized processing system that distributes these data to customers around the world. GONG development was initially sponsored by the National Science Foundation but now that it is in steady state, operational funding must be established from its customer base. NOAA’s Space Weather Prediction Center (SWPC) is currently one of these customers. GONG research data is a critical input to SWPC’s WSA-Enlil solar wind model, which runs on NOAA’s operational supercomputer systems. This investment will allow NOAA to provide funding for the NSO to support continued operations of the world-wide GONG observatories. The investment will also ensure that these data are properly archived via NOAA’s Comprehensive Large Array-data Stewardship System (CLASS) located at the National Geophysical Data Center (NGDC).

NOAA will invest \$1,500,000 to augment R2O activities for critical space weather numerical model development and related O&M. This investment will advance the Sun to Earth suite of numerical models that will provide improved operational forecasts of space weather. The Sun to Earth suite includes WSA-Enlil solar wind model, Wing Kp Index model for geomagnetic predictions, Kalman Filter data assimilation model used in the U.S. Total Electron Content product, and STORM Time Empirical Ionospheric Correction Model, as well as the WAM currently under development. Depending upon their status in the development process, these models will either be updated or transitioned to operations with this investment. NOAA will accomplish these activities with assistance from other Federal agencies, academia, and private industry. This will ensure that continuous stream of advancements are being made to the existing space weather modeling suite.

Structure	
PPA: Observations	PPA: Science & Technology Integration
Base: \$0	Base: \$2,400,000
Program Change: \$1,000,000	Program Change: \$1,500,000

Statement of Need and Economic Benefits:

Space weather has the demonstrated potential to disrupt every major public infrastructure system, including power grids, transportation systems, communications, satellites, and GPS. Timely and accurate alerts and warnings can mitigate these effects, allowing all sectors to prepare for potentially damaging space weather, such as coronal mass ejections (CME). Strong space weather storms that can impact critical elements of the Nation’s infrastructure can occur over 100 times during the 11-13 year solar cycle. The Nation’s advanced technology service providers rely on NOAA for the alerts, watches and warnings needed to protect lives and livelihood and ensure continuity of their critical operations. The proposed funding will improve

critical space weather prediction services by operationalizing a NWS suite of models to support key industries such as commercial airline, electric power, and the GPS industry.

Resource Assessment:

Resources for continuous improvements to NOAA's space weather numerical modeling suite are critical. Current resources provide for routine O&M of older space weather numerical models with only minimal advancements in science or technology. Current investment levels are not adequate to provide for robust and continuous improvements to the Nations' operational suite of space weather numerical models.

Schedule and Milestones:

FY 2016

- Implement a Geospace model into operations on NOAA supercomputers
- Begin O&M support for WSA-Enlil and Geospace models
- Begin pre-implementation testing of the induced electric field (E-Field) model
- Begin transition of operational GONG centralized space weather processing at NOAA
- Establish GONG archive on NOAA CLASS
- Establish support contract for GONG observatories

FY 2017

- Begin full evaluation mode of the WAM with a coupled ionosphere model on NOAA supercomputers
- Complete transition of operational GONG centralized space weather data processing at NOAA
- Implement the E-Field model into operations as a part of the Sun to Earth modeling suite
- Continue GONG data processing and observatory support contract

FY 2018

- Implement WAM with a coupled ionosphere model into operations as a part of the Sun to Earth modeling suite
- Begin O&M support of E-field model
- Continue GONG data processing and observatory support contract

FY 2019

- Begin O&M support of WAM with a coupled ionosphere model
- Continue GONG data processing and observatory support contract

Deliverables:

- Improved forecasts are provided to the Nation's critical infrastructure to ensure lives and property are protected from the effects of space weather
- Operational GONG data provided to NOAA's Sun to Earth space weather modeling suite

Performance Goals and Measurement Data:

Performance Measure: Median percent (%) of time during which GONG data are available to be processed for NOAA Space Weather models	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	95%	99.9%	99.9%	99.9%	99.9%
Without Increase	91%	91%	91%	91%	91%	91%	91%
Description: The assumption of the performance metric is that by FY 2017 GONG data processing will be operational at NOAA.							

Performance Measure: Percent (%) of the mission required Sun to Earth space weather model suite implemented and operationally supported	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	50%	75%	100%	100%	100%
Without Increase	25%	25%	25%	25%	25%	25%	25%
Description: The assumption of the performance metric is that by FY 2018 NOAA will have implemented the full suite of Sun to Earth numerical space weather models							

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: National Weather Service
Sub-program: Observations
Program Change: Space Weather Observations and Numerical Model Transition to Operations

Object Class		FY 2016 Increase	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$67,120
11.3	Other than full-time permanent	0	100
11.5	Other personnel compensation	0	2,131
11.6	Leave Surcharge Full-Time	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	<u>0</u>	69,351
12	Civilian personnel benefits	0	20,302
13	Benefits for former personnel	0	37
21	Travel and transportation of persons	0	1,229
22	Transportation of things	0	2,114
23.1	Rental payments to GSA	0	2,040
23.2	Rental Payments to others	0	2,126
23.3	Communications, utilities and misc charges	350	14,539
24	Printing and reproduction	0	27
25.1	Advisory and assistance services	0	33,886
25.2	Other services	0	30,392
25.3	Purchases of goods & services from Gov't accounts	650	2,000
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	715
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	28,491
31	Equipment	0	3,179
32	Lands and structures	0	1
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	2,076
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	4
44	Refunds	0	0
99	Total obligations	<u>1,000</u>	212,509

Due to financial system limitations, the object class detail for the Program reflects the Observations PPA.

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: National Weather Service
Sub-program: Science & Technology Integration
Program Change: Space Weather Observations and Numerical Model Transition to Operations

Object Class		FY 2016 Increase	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$48,873
11.3	Other than full-time permanent	0	197
11.5	Other personnel compensation	0	1,257
11.6	Leave Surcharge Full-Time	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	<hr/> 0	50,327
12	Civilian personnel benefits	0	14,658
13	Benefits for former personnel	0	76
21	Travel and transportation of persons	0	767
22	Transportation of things	0	52
23.1	Rental payments to GSA	0	0
23.2	Rental Payments to others	0	2,660
23.3	Communications, utilities and misc charges	0	954
24	Printing and reproduction	0	22
25.1	Advisory and assistance services	1,250	13,601
25.2	Other services	250	13,165
25.3	Purchases of goods & services from Gov't accounts	0	2,377
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	50
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	427
31	Equipment	0	1,825
32	Lands and structures	0	2,764
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	23,456
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	16
44	Refunds	0	0
99	Total obligations	<hr/> 1,500	\$127,197

Due to financial system limitations, the object class detail for the Program reflects the Science & Technology Integration PPA.

Observations: National Mesonet Network: (Base Funding: \$16,000,000 and 0 FTE; Program Change: -\$10,500,000 and 0 FTE): NOAA requests a decrease of \$10,500,000 and 0 FTE for a total \$5,500,000 and 0 FTE. The request restores National Mesonet Network funding to levels included in the FY 2015 President's Budget. NOAA is using congressionally directed FY 2015 funding, as provided in the Consolidated and Further Continuing Appropriations Act of FY 2015, to continue to ingest data from mesonets, which can identify small scale features at the surface, such as changes in wind speed/direction, temperature, and pressure, each of which can indicate rapidly deteriorating weather conditions not shown by other observations. NWS created a national mesonet program within NOAA through the Consolidated Appropriations Act, 2014.

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: National Weather Service
Sub-program: Observations
Program Change: National Mesonet Network

Object Class		FY 2016 Decrease	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$67,120
11.3	Other than full-time permanent	0	100
11.5	Other personnel compensation	0	2,131
11.6	Leave Surcharge Full-Time	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	0	69,351
12	Civilian personnel benefits	0	20,302
13	Benefits for former personnel	0	37
21	Travel and transportation of persons	0	1,229
22	Transportation of things	0	2,114
23.1	Rental payments to GSA	0	2,040
23.2	Rental Payments to others	0	2,126
23.3	Communications, utilities and misc charges	0	14,539
24	Printing and reproduction	0	27
25.1	Advisory and assistance services	0	33,886
25.2	Other services	(10,500)	19,892
25.3	Purchases of goods & services from Gov't accounts	0	2,000
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	715
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	28,491
31	Equipment	0	3,179
32	Lands and structures	0	1
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	2,076
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	4
44	Refunds	0	0
99	Total obligations	(10,500)	202,009

Due to financial system limitations, the object class detail for the Program reflects the Observations PPA.

Central Processing: Establishment of Regional Enterprise Application Development and Integration Teams: (Base Funding: \$12,645,000 and 122 FTE; Program Change:

-\$10,100,000 and -98 FTE): NOAA requests a decrease of \$10,100,000 and 98 FTE for a total of \$2,545,000 and 24 FTE to reflect the significant efficiencies that can be achieved by transition to a new IT service delivery model for the NWS forecast offices.

Proposed Actions:

The NWS has identified efficiencies which have been realized in the delivery of IT support services to field offices through investments in open source software and implementation of IT best practices. In FY 2016, NWS proposes to consolidate 122 Information Technology Officer (ITO) full-time equivalents (FTE) (one from each WFO) to a regional approach consisting of 24 ITO FTEs allocated at the six NWS Regional Headquarters and the National Headquarters through the establishment of Regional Enterprise Application Development and Integration (READI) teams.

The current service delivery model has redundancies and through regionalization of these IT support functions, significant efficiencies can be realized in service delivery. These savings can be accomplished by leveraging upgrades and improvements to existing systems and new technologies, such as the ongoing AWIPS II, deployment and adopting a more efficient service model. Through investments in IT, NWS has gained the ability to fulfill the ITO responsibilities remotely, including systems analysis and software modifications and updates. These technology efficiencies enable NWS to reduce its workforce without impacting its mission to protect lives and property and enable the agency to provide a higher degree of consistency in service delivery.

The READI teams will have responsibility in these two primary areas which the ITOs currently manage:

- Enterprise compatible application development and integration; and
- IT management and systems analysis.

These READI teams will ensure the working order of all computer applications and software including regular maintenance and installation of new software. The IT teams will be available to each WFO as a source of software and information technology expertise. The READI concept plans to replicate the service currently provided by on-site ITOs with a regional approach that meets or exceeds current service levels.

Establishing READI teams is a critical part of evolving the NWS. NWS is taking many steps to find innovative ways of meeting its mission as well as strategically build its workforce and structure its organization. This is a step in ensuring the NWS workforce is both prepared and right sized for an evolved NWS. In 2014, NWS took important steps such as initiating NWC staffing and reorganizing NWS HQ to align with the newly approved budget and portfolio structure. In 2015, NWS is continuing those activities by bringing the NWC up to Initial Operating Capability, initiating strategic office relocations, and beginning an enterprise staffing analysis. Additionally, during 2015 NWS is finalizing its report on IT consolidation and related cost savings. This report will be submitted to the Committees by the summer of 2015. In 2016, NWS will be developing a strategic staffing plan which will fully show the future of the NWS workforce. Although that staffing plan is not completed, some actions such as the HQ reorganization and establishment of the READI teams provide clear operational efficiencies even in advance of that plan. Establishing the READI teams provides sustainable IT delivery operations and allows NWS to take advantage of significant technological advancements.

NWS will make every effort to minimize the impact to affected employees and reduce ITO staffing through attrition across the entire organization. Many current ITOs can qualify for other NWS positions, such as meteorologists or electronics systems analysts. In addition, NWS will explore opportunities for voluntary separation incentives for interested individuals.

Resource Assessment:

Current resource assessment is provided in the Central Processing narrative.

Schedule and Milestones:

FY 2016

- Finalize consolidation plans
- Execute ITO consolidation
- Staff READI teams

Deliverables:

- READI teams at six NWS Regional Headquarters and the National Headquarters which meet or exceed current levels of service

PROGRAM CHANGE PERSONNEL DETAIL

Program: National Weather Service
Sub-program: Central Processing
Program Change: Establishment of Regional Enterprise Application Development and Integration Teams

<u>Title:</u>	<u>Location</u>	<u>Grade</u>	<u>Number of Positions</u>	<u>Annual Salary</u>	<u>Total Salaries</u>
Information Technology Officer	various*	GS-13	(98)	\$83,468	(\$8,179,905)
Subtotal			<u>(98)</u>		<u>(\$8,179,905)</u>
Less Lapse	0%		<u>0</u>		<u>\$0</u>
Total Full-time permanent:			(98)		(\$8,179,905)
2016 Pay Adjustment	1.3%				(\$106,339)
TOTAL			(98)		(\$8,286,244)
Personnel Data			<u>Number</u>		
Full-time Equivalent Employment					
Full-time permanent			(98)		
Other than full-time permanent			<u>0</u>		
Total			(98)		
Authorized Positions:					
Full-time permanent			(98)		
Other than full-time permanent			<u>0</u>		
Total			(98)		

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: National Weather Service
Sub-program: Central Processing
Program Change: Establishment of Regional Enterprise Application Development and Integration Teams

Object Class	FY 2016 Decrease	FY 2016 Total Program
11 Personnel compensation		
11.1 Full-time permanent	(\$8,286)	\$17,145
11.3 Other than full-time permanent	0	2
11.5 Other personnel compensation	0	636
11.6 Leave Surcharge Full-Time	0	0
11.8 Special personnel services payments	0	0
11.9 Total personnel compensation	(8,286)	17,783
12 Civilian personnel benefits	(1,814)	5,829
13 Benefits for former personnel	0	11
21 Travel and transportation of persons	0	325
22 Transportation of things	0	92
23.1 Rental payments to GSA	0	5,795
23.2 Rental Payments to others	0	0
23.3 Communications, utilities and misc charges	0	646
24 Printing and reproduction	0	11
25.1 Advisory and assistance services	0	7,273
25.2 Other services	0	40,396
25.3 Purchases of goods & services from Gov't accounts	0	891
25.4 Operation and maintenance of facilities	0	0
25.5 Research and development contracts	0	0
25.6 Medical care	0	0
25.7 Operation and maintenance of equipment	0	0
25.8 Subsistence and support of persons	0	0
26 Supplies and materials	0	767
31 Equipment	0	4,502
32 Lands and structures	0	0
33 Investments and loans	0	0
41 Grants, subsidies and contributions	0	3,578
42 Insurance claims and indemnities	0	0
43 Interest and dividends	0	3
44 Refunds	0	0
99 Total obligations	(10,100)	87,902

Due to financial system limitations, the object class detail for the Program reflects the Central Processing PPA.

Analyze, Forecast & Support: Weather Forecast Office Maintenance: (Base Funding: \$6,600,000 and 0 FTE; Program Change: \$1,000,000 and 0 FTE): NOAA requests an increase of \$1,000,000 and 0 FTE for a total of \$7,600,000 and 0 FTE to restore WFO Maintenance funding that was decreased in prior years due to budgetary constraints.

Proposed Action:

The WFO Maintenance program funds preventive and routine services to the WFO's including heating and air conditioning, safety, electrical, roofing inspections and maintenance. The WFO Maintenance program allows NWS to protect its facility capital investment last modernized in the early 1990's in accordance with NWS operational standards, along with GSA and private industry standards. As WFO's continue to age, the facilities require increasing levels of routine maintenance. Requested funding will allow NWS to increase routine maintenance efforts and will extend the time between system replacements.

NOAA must ensure its facilities provide modern, sustainable, and safe environments to fulfill its mission successfully and to attract and retain a high-performance workforce. Like other NOAA capital assets, NOAA's facilities require routine recapitalization, renovation, and modernization to provide state-of-the-art capabilities.

Investment in WFO maintenance mitigates operational risks associated with providing continuous weather forecast and warning operations, and helps comply with GSA and private industry standards. Standards of structural integrity, maintenance, security, temperature control, and adequate utilities ensure those forecasters, and the computing and system resources they rely on, meet regulations for issuing weather forecasts and warnings. Further, many WFOs are located in severe weather areas, such as those that experience tornados and hurricanes, where citizens, emergency managers, and local officials count on the timely and accurate delivery of weather warnings. There are also cost saving associated with preventing emergency repairs.

Statement of Need and Economic Benefits:

To support its mission, the NWS operates and maintains a number of unique facilities including 122 WFOs, 13 RFCs, 18 WSOs, 9 National Centers, and two Data Collection Offices (DCOs). These facilities protect critical equipment and employees, and require regular preventive maintenance and emergency repairs. Proper and consistent maintenance, including the installation and maintenance of physical security systems in compliance with Department of Commerce and Department of Justice mandates, is essential to safeguard operations and reduce inherent risks to personnel and visitor safety.

Resource Assessment:

The current resources for this activity are described in the Analyze, Forecast & Support narrative. A restoration of resources is needed to address critical system component repairs in NWS's aging facilities and backlogged repair requests. Without additional resources, NWS facilities will continue to experience significant deterioration and backlogged repair requests.

Schedule and Milestones:

FY 2016-2020

- Conduct routine WFO maintenance

Deliverables:

- Routine WFO maintenance

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: National Weather Service
Sub-program: Analyze, Forecast & Support
Program Change: Weather Forecast Office Maintenance

Object Class		FY 2016 Increase	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$270,585
11.3	Other than full-time permanent	0	395
11.5	Other personnel compensation	0	25,385
11.6	Leave Surcharge Full-Time	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	0	296,365
12	Civilian personnel benefits	0	95,244
13	Benefits for former personnel	0	248
21	Travel and transportation of persons	0	5,459
22	Transportation of things	0	4,708
23.1	Rental payments to GSA	0	5,337
23.2	Rental Payments to others	0	3,857
23.3	Communications, utilities and misc charges	0	11,540
24	Printing and reproduction	0	213
25.1	Advisory and assistance services	0	8,527
25.2	Other services	1,000	30,250
25.3	Purchases of goods & services from Gov't accounts	0	2,157
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	8,924
31	Equipment	0	6,957
32	Lands and structures	0	3,288
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	11,457
42	Insurance claims and indemnities	0	7
43	Interest and dividends	0	7
44	Refunds	0	0
99	Total obligations	1,000	494,545

Due to financial system limitations, the object class detail for the Program reflects the Analyze, Forecast & Support PPA.

Analyze, Forecast and Support and Science & Technology Integration: Enhanced Water Prediction Capability: (Base Funding: \$5,500,000 and 0 FTE; Program Change: \$4,000,000 and 0 FTE): NOAA requests an increase of \$4,000,000 and 0 FTE for a total of \$9,500,000 and 0 FTE to expand NWS' hydrologic forecast services to provide improved flood forecasts and inundation mapping.

Proposed Actions:

Funding in the FY 2015 Enacted enables the NWS to develop and test new centralized national hydrologic modeling and forecast capabilities at the National Water Center (NWC). Centralized water modeling will improve efficiency and consistency in the hydrologic forecast process, apply to all water conditions, and provide predictions on a high resolution grid.

The FY 2016 request builds upon the FY 2015 Enacted by extending centralized modeling science and technology to enable seamless and consistent prediction of flash floods and urban flood inundation mapping. Addition of new capabilities to the centralized water model will allow the model to “zoom in” on areas where there are severe storms and heavy rains, and show the routing and interaction of flood waters across the terrain. Linking output to the Federal Emergency Management Agency (FEMA) database will allow estimation of economic impacts associated with flash floods and urban flood inundation. Together, these capabilities are key to providing stakeholder-requested nationally consistent flash flood services and dynamic flood inundation maps that illustrate the predicted locations and depths of urban flooding. Specifically, this request involves:

- Developing and implementing the Dynamically Nested Hyper-Resolution Flexible Mesh (DNHRFM) capability within the centralized water model.
- Implementing 2D hydraulic modeling within the centralized water model.
- Implementing linkages to FEMA’s flood risk database.
- Developing and implementing a hyper-resolution geospatial terrain and infrastructure database for three regional areas.
- Regionally demonstrating hyper-resolution flood inundation forecast maps showing the areal extent and depth of floodwaters that allow emergency managers to preposition people and resources to effectively mitigate impacts and build more resilient communities.
- Demonstrating risk-based decision support services, built on high-resolution water budget information from centralized modeling and DNHRFM, for stakeholders in emergency management, agriculture, energy, and transportation sectors to address priority needs that have been identified through Integrated Water Resources Science and Service (IWRSS) stakeholder forums.
- Demonstrating integrated operational production and decision support service delivery linking new centralized NWC capabilities with regional NWS River Forecast Centers and local NWS Weather Forecast Offices.
- Improving the capability of NOAA to participate and achieve common interagency goals associated with IWRSS program.

Structure			
PPA: Analyze, Forecast & Support		PPA: Science & Technology Integration	
Base:	\$1,500,000	Base:	\$4,000,000
Program Change:	\$2,000,000	Program Change:	\$2,000,000

Requested funds support NWC operations and maintenance in the AFS PPA. Requested funds in the Science & Technology Integration PPA go towards development and demonstration activities, visiting scientists/contractors, and related support necessary for successful implementation of the improved and expanded suite of hydrologic services. This project will leverage existing collaborations with Federal agencies such as the United States Army Corps of Engineers (USACE), the United States Geological Survey (USGS), FEMA, and State-based research institutions supported by the National Science Foundation (NSF), as well as other public or private entities considered to be appropriate.

NOAA, USACE, USGS and FEMA recognize these water resource challenges and are committed to addressing them. In May 2011, the Under Secretary of Commerce for Oceans & Atmosphere & Administrator, Assistant Secretary of the Army, and Director of USGS signed a Memorandum of Understanding (MOU) establishing the IWRSS consortium. FEMA plans to formally join the IWRSS consortium in FY 2014. IWRSS will leverage complementary investments in hydrologic data, science, and technology to establish a common operating picture and deliver comprehensive water resources information to the Nation.

Statement of Need and Economic Benefits:

Water resources are now considered to be one of the greatest challenges facing our Nation in the 21st century. In the United States and globally, we face a triple threat: population growth and economic development are stressing water supplies and increasing vulnerability; a changing climate is impacting water availability and quality, increasing uncertainty and the frequency of extreme events; and an aging water infrastructure is forcing critical, expensive decisions. Investment in enhanced water prediction capabilities mitigates strategic, operational, safety and security, and reputation risks. Without this investment to enhance the centralized model, NWS will continue to use water resources prediction capabilities that are insufficient to address the Nation's growing challenges in hydrologic extremes and water security.

Emergency managers need actionable predictive flash flood and urban flood inundation mapping and impacts information to plan mitigation and response resources, minimize impacts, and increase resiliency. This request shifts the emergency management paradigm from just knowing there's going to be a flood with uniform water depth relative to a single reference point elevation on a river, to knowing specifically where and how severe it will be; what homes, schools, hospitals, waste treatment facilities, power plants, evacuation routes and other key infrastructure are at risk; and what the potential economic impacts will be.

Resource Assessment:

The current resources for this activity are described in the AFS and STI narratives. Requested funding for AFS will provide the resources to support NWC operations as it expands to support the Hydrological Services and Warnings and Water Resources program. Requested funding in STI is needed to extend centralized modeling science and technology to enable seamless and consistent prediction of flash floods and urban flood inundation mapping.

Schedule and Milestones:

FY 2016 – 2020:

- Expand centralized modeling capability to provide hyper-resolution modeling capability, 2D hydraulic modeling, and linkages to the FEMA database for three regional areas
- Demonstrate high resolution large watershed modeling with nested hyper-resolution modeling over three regional areas
- Begin providing sector-specific decision-support operations and services for regional areas
- Demonstrate risk- and impact-based decision support through NWC operations center

Deliverables:

- Provide targeted sector-specific operations and decision-support services for demonstration areas
- Improved public access to Federal water information
- Improved integration of water resources prediction services into operations and services

Performance Goals and Measurement Data:

Performance Measure: Real-time flood inundation mapping demonstration areas	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	0	0	1	2	3
Without Increase	N/A	N/A	0	0	0	0	0
Description: Prototype flood forecast inundation mapping will be demonstrated in selected high-impact watersheds. These demonstration areas are for three regional (approximately 400,000 km ²) areas. Together these three areas would comprise approximately one-eighth of the land area of the United States.							

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: National Weather Service
Sub-program: Analyze, Forecast & Support
Program Change: Enhanced Water Prediction Capability

Object Class		FY 2016 Increase	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$270,585
11.3	Other than full-time permanent	0	395
11.5	Other personnel compensation	0	25,385
11.6	Leave Surcharge Full-Time	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	0	296,365
12	Civilian personnel benefits	0	95,244
13	Benefits for former personnel	0	248
21	Travel and transportation of persons	0	5,459
22	Transportation of things	0	4,708
23.1	Rental payments to GSA	0	5,337
23.2	Rental Payments to others	0	3,857
23.3	Communications, utilities and misc charges	1,500	13,040
24	Printing and reproduction	0	213
25.1	Advisory and assistance services	0	8,527
25.2	Other services	500	29,750
25.3	Purchases of goods & services from Gov't accounts	0	2,157
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	8,924
31	Equipment	0	6,957
32	Lands and structures	0	3,288
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	11,457
42	Insurance claims and indemnities	0	7
43	Interest and dividends	0	7
44	Refunds	0	0
99	Total obligations	2,000	495,545

Due to financial system limitations, the object class detail for the Program reflects the Analyze, Forecast & Support PPA.

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: National Weather Service
Sub-program: Science & Technology Integration
Program Change: Enhanced Water Prediction Capability

Object Class		FY 2016 Increase	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$48,873
11.3	Other than full-time permanent	0	197
11.5	Other personnel compensation	0	1,257
11.6	Leave Surcharge Full-Time	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	<u>\$0</u>	<u>\$50,327</u>
12	Civilian personnel benefits	0	14,658
13	Benefits for former personnel	0	76
21	Travel and transportation of persons	0	767
22	Transportation of things	0	52
23.1	Rental payments to GSA	0	0
23.2	Rental Payments to others	0	2,660
23.3	Communications, utilities and misc charges	0	954
24	Printing and reproduction	0	22
25.1	Advisory and assistance services	1,050	13,401
25.2	Other services	950	13,865
25.3	Purchases of goods & services from Gov't accounts	0	2,377
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	50
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	427
31	Equipment	0	1,825
32	Lands and structures	0	2,764
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	23,456
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	16
44	Refunds	0	0
99	Total obligations	<u>2,000</u>	<u>127,697</u>

Due to financial system limitations, the object class detail for the Program reflects the Science & Technology Integration PPA.

Analyze, Forecast & Support: National Tsunami Hazard Mitigation Program Grants: (Base Funding: \$14,695,000 and 27 FTE; Program Change: -\$6,000,000 and 0 FTE): NOAA requests a decrease of \$6,000,000 and 0 FTE for a total of \$8,695,000,000 and 27 FTE. For FY 2016, this reduction eliminates NOAA's partner funding for education and awareness programs through the National Tsunami Hazard Mitigation Program (NTHMP).

Proposed Actions:

NOAA proposes to eliminate NTHMP grant funding supporting local education, awareness, and inundation and evacuation map development. NOAA is not seeking to terminate NTHMP with this action. NOAA will continue to fund critical tsunami program components in order to ensure timely and accurate tsunami warnings, watches and advisories.

NOAA is committed to maintaining its strong forecast and warning program through the operations of its two Tsunami Warning Centers (Pacific Tsunami Warning Center and National Tsunami Warning Center located in Alaska), targeted research and development and international coordination activities.

Resource Assessment:

Current resources are being used to maintain a U.S. Tsunami Warning System in accordance with P.L.109-427. These resources reside in the both the Observations and the Analyze, Forecast & Support (AFS) PPAs. This program change only affects activities in the Analyze, Forecast & Support PPA.

AFS activities include operations of two 24x7 Tsunami Warning Centers tsunami forecast inundation mapping and model development, research and development for improved tsunami detection and analysis capabilities, and continued administration of the TsunamiReady™ Program. Observations activities include data collected from the DART® stations and sea-level and seismic networks and will not be affected by this decrease. The DART® array consists of 39 deep-water buoys located throughout the Pacific Ocean, Atlantic Ocean, and Caribbean.

Schedule and Milestones:

FY 2016 – 2020:

- Operate Tsunami Warning Centers
- Operate the International Tsunami Information Center and the Caribbean Tsunami Warning Program
- Sustain TsunamiReady™ Program

Deliverables:

- Operational Tsunami Warning Centers
- Operational International Tsunami Information Center and Caribbean Tsunami Warning Program

Performance Goals and Measurement Data:

Performance Measure:	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
TsunamiReady Communities							
With Decrease	N/A	N/A	192	192	192	192	192
Without Decrease	177	187	197	207	217	227	237
<p>Description: This measure represents the cumulative number of communities that NOAA designates as being adequately prepared for a tsunami. As a voluntary program, the communities earn the designation through spreading awareness of tsunamis, educating community members, and improving emergency evacuation plans.</p>							

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: National Weather Service
Sub-program: Analyze, Forecast & Support
Program Change: National Tsunami Hazard Mitigation Program Grants

Object Class	FY 2016 Decrease	FY 2016 Total Program
11 Personnel compensation		
11.1 Full-time permanent	\$0	\$270,585
11.3 Other than full-time permanent	0	395
11.5 Other personnel compensation	0	25,385
11.6 Leave Surcharge Full-Time	0	0
11.8 Special personnel services payments	0	0
11.9 Total personnel compensation	0	296,365
12 Civilian personnel benefits	0	95,244
13 Benefits for former personnel	0	248
21 Travel and transportation of persons	0	5,459
22 Transportation of things	0	4,708
23.1 Rental payments to GSA	0	5,337
23.2 Rental Payments to others	0	3,857
23.3 Communications, utilities and misc charges	0	11,540
24 Printing and reproduction	0	213
25.1 Advisory and assistance services	0	8,527
25.2 Other services	0	29,250
25.3 Purchases of goods & services from Gov't accounts	0	2,157
25.4 Operation and maintenance of facilities	0	0
25.5 Research and development contracts	0	0
25.6 Medical care	0	0
25.7 Operation and maintenance of equipment	0	0
25.8 Subsistence and support of persons	0	0
26 Supplies and materials	0	8,924
31 Equipment	0	6,957
32 Lands and structures	0	3,288
33 Investments and loans	0	0
41 Grants, subsidies and contributions	(6,000)	5,457
42 Insurance claims and indemnities	0	7
43 Interest and dividends	0	7
44 Refunds	0	0
99 Total obligations	(6,000)	487,545

Due to financial system limitations, the object class detail for the Program reflects the Analyze, Forecast & Support PPA.

Analyze, Forecast and Support: Operational Base Adjustment: (Base Funding: \$493,545,000 and 0 FTE; Program Change: -\$700,000 and 0 FTE): NOAA requests a decrease of \$700,000 and 0 FTE for a total of \$492,845,000 and 3,058 FTE. In FY 2015 Congress provided an unspecified \$700,000 above the President's requested level for NWS' Analyze, Forecast and Support (AFS). Reductions will be realized in scalable activities such as travel and other administrative functions. At this funding level, NWS will maintain its ability to produce timely and accurate forecasts and warnings.

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: National Weather Service
Sub-program: Analyze, Forecast & Support
Program Change: Operational Base Adjustment

Object Class	FY 2016 Decrease	FY 2016 Total Program
11 Personnel compensation		
11.1 Full-time permanent	\$0	\$270,585
11.3 Other than full-time permanent	0	395
11.5 Other personnel compensation	0	25,385
11.6 Leave Surcharge Full-Time	0	0
11.8 Special personnel services payments	0	0
11.9 Total personnel compensation	0	296,365
12 Civilian personnel benefits	0	95,244
13 Benefits for former personnel	0	248
21 Travel and transportation of persons	(250)	5,209
22 Transportation of things	0	4,708
23.1 Rental payments to GSA	0	5,337
23.2 Rental Payments to others	0	3,857
23.3 Communications, utilities and misc charges	0	11,540
24 Printing and reproduction	0	213
25.1 Advisory and assistance services	(300)	8,227
25.2 Other services	0	29,250
25.3 Purchases of goods & services from Gov't accounts	0	2,157
25.4 Operation and maintenance of facilities	0	0
25.5 Research and development contracts	0	0
25.6 Medical care	0	0
25.7 Operation and maintenance of equipment	0	0
25.8 Subsistence and support of persons	0	0
26 Supplies and materials	(150)	8,924
31 Equipment	0	6,957
32 Lands and structures	0	3,288
33 Investments and loans	0	0
41 Grants, subsidies and contributions	0	11,457
42 Insurance claims and indemnities	0	7
43 Interest and dividends	0	7
44 Refunds	0	0
99 Total obligations	(700)	492,995

Science & Technology Integration: Improving Mid-Range Weather Outlooks: (Base Funding: \$0 and 0 FTE; Program Change: \$5,000,000 and 0 FTE): NOAA requests a total increase of \$9,000,000 and 0 FTE for a total of \$9,000,000 and 0 FTE to extend outlooks out through weeks three and four (mid-range). Of this total, NOAA requests \$5,000,000 for the NWS and \$4,000,000 for NOAA's Office of Atmospheric Research (OAR). This narrative is a cross-Line Office initiative coordinated with) OAR's proposal "Research to Improve Mid-Range Weather Outlooks." Together these initiatives will ultimately allow NOAA to provide for 30 day weather and water outlooks and longer lead severe storm outlooks.

Proposed Actions:

The FY 2016 request proposes to extend weather outlooks beyond current limits; initial actions will focus on weeks three and four. Addressing this challenge will require a sustained scientific research and research-to-operations efforts. These efforts include designing, developing, implementing and operating the multi-model coupled earth system modeling system that will be needed to support effective decision making. Specifically, this request involves:

- Transitioning the current North American Multi-model Ensemble (NMME), research capability currently undergoing operational test and evaluation into NWS operations as part of the operational suite of systems. This includes:
 - Transitioning two existing global, coupled models included in the NMME from research into NCEP operations.
 - Design, develop and deploy new and enhanced prediction systems to include state-of-the-art coupled data assimilation and analysis techniques, improved models including both physical Earth system components (atmosphere, ocean, land, sea-ice and ice over land) as well as coupling these component systems into a comprehensive physical Earth system model.
- Enhancements to operational services including the development, testing and operational implementation of new products tailored to evolving user needs, including temperature and precipitation outlooks for weeks three and four, and a week two heat watch system.

Statement of Need and Economic Benefits:

Important decisions in sectors ranging from food security and public health, to emergency management and national security need additional information at timescales beyond traditional limits for weather outlooks, currently only 10-14 days, to include weeks three and four. Today, NOAA does not have the ability to make medium range outlooks better than the climatological average. Specific examples of user needs for extended outlook information that enable greater climate resiliency include:

- Food Security: Regional drought early warning systems are important for the nation's food security and economy.
- Public Health: Extended outlooks of impending extreme heat events will inform state and local planning, including emergency management and preparedness.
- Water Resource Management: River flow and river discharge predictions out to 3-4 weeks would assist flood prediction, reservoir management, and hydroelectric power generation.²
- Disaster Risk Management: FEMA works closely with NOAA to bridge climate and weather outlooks to inform extreme event disaster preparedness, and to ensure consistent messaging as these events approach.

² http://www.wmo.int/pages/prog/arep/wwrp/new/documents/S2S_Implem_plan_en.pdf

- Arctic Access and Use: Ice outlooks will be important to the oil and gas industry; forecasts of maritime weather and sea ice weeks in advance are crucial for safe navigation.³
- National Security: Security planners need expanded weather outlooks to assess weather-driven exacerbation of political hotspots and crises, and plan contingencies. International users need these improved weather outlooks for the developing world across sectors including human health (e.g., famine, malaria) and national security.

Resource Assessment:

This is a new initiative and does not have any current transitional or operational funding.

Schedule and Milestones:

FY 2016

- Convert week three and four temperature and precipitation outlooks from experimental to operational
- Develop experimental tropical cyclogenesis outlook for weeks three and four
- Develop experimental coupled atmosphere-ocean-land-wave-sea ice model to enable extending operational weather outlooks out to 30 days

FY 2017

- Transition the Geophysical Fluid Dynamics Laboratory (GFDL) Forecast oriented Low Ocean Resolution (FLOR) model from research into NCEP operations
- Convert week-two heat watch outlook from experimental to operational

FY 2018

- Implement operational global coupled atmosphere-ocean-land-wave-sea ice model and extending operational weather outlooks from 16 days to 30 days

FY 2018 – 2020

- Continuous upgrade of NMME models and data assimilation approaches in order to maximize potential skill in the week three and four time range, including current operational systems
- Develop new week three and four outlooks (i.e. severe weather, storminess, etc.)

Deliverables:

- NWS experimental products transitioned into operations and issued multiple times per month
- New NWS experimental products focused on extreme events (i.e. severe weather, heat/cold waves, tropical cyclones, etc.)
- Global operational coupled atmosphere-ocean-land-wave-sea ice prediction system extending today's operational weather outlooks from 16 days out to 30 days
- Annual upgrade of operational component models incorporating research advancements
- Improved model physics enabling extracting predictability for week- three and four time scales

³ <http://www.arctic.noaa.gov/NOAAarcticactionplan2014.pdf>

Performance Goals and Measurement Data:

Performance Measure:	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
Week 3-4 temperature outlook accuracy							
With Increase	N/A	N/A	0	5	8	10	12
Without Increase	N/A	N/A	0	0	0	0	0
Description: Daily week three and four outlooks for U.S. surface temperature are reported as either above normal, near normal, below normal or, where no definite guidance can be provided, equal chances.							

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: National Weather Service
Sub-program: Science & Technology Integration
Program Change: Improving Mid-Range Weather Outlooks

Object Class		FY 2016 Increase	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$48,873
11.3	Other than full-time permanent	0	197
11.5	Other personnel compensation	0	1,257
11.6	Leave Surcharge Full-Time	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	<u>\$0</u>	<u>\$50,327</u>
12	Civilian personnel benefits	0	14,658
13	Benefits for former personnel	0	76
21	Travel and transportation of persons	50	817
22	Transportation of things	5	57
23.1	Rental payments to GSA	0	0
23.2	Rental Payments to others	0	2,660
23.3	Communications, utilities and misc charges	0	954
24	Printing and reproduction	0	22
25.1	Advisory and assistance services	4,150	16,501
25.2	Other services	750	13,665
25.3	Purchases of goods & services from Gov't accounts	0	2,377
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	50
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	25	452
31	Equipment	20	1,845
32	Lands and structures	0	2,764
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	23,456
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	16
44	Refunds	0	0
99	Total obligations	<u>5,000</u>	<u>130,697</u>

Due to financial system limitations, the object class detail for the Program reflects the Science & Technology Integration PPA.

**APPROPRIATION ACCOUNT: PROCUREMENT, ACQUISITION, AND CONSTRUCTION
SUB-PROGRAM: NWS SYSTEMS ACQUISITION**

The objectives of the Systems Acquisition sub-program are to:

- Enhance NOAA's operational observational suite;
- Provide High Performance Computing (HPC) capacity of operations and development;
- Develop forecaster tools for improved decision support; and
- Enhance NOAA's dissemination capabilities for weather and climate services and products.

OBSERVATIONS

The Observations PPA supports the life-cycle of all NWS observing system investments by providing technical solutions to address new NWS operational observational requirements. With PAC funding, NOAA develops improvements to current observational capabilities, provides for large scale recapitalization of significant observational systems, and engineers technical solutions for systems to meet changing requirements and demands.

Specifically with the PAC appropriation, the Observations PPA:

- Implements improved sensors to the current observational suite; and
- Conducts Service Life Extension Programs to sustain operational availability of the nation's observational weather radar network.

To achieve these goals, Observations maintains the following programs:

Radar Observations Program executes the NEXRAD Weather Surveillance Radar -1988 Doppler (WSR-88D) system effort.

- NEXRAD is one of the most important elements in NOAA's capability to warn for severe weather such as tornados, hail, and damaging thunderstorm induced-high winds. NEXRAD provides automated signal processing, computerized data processing by sophisticated meteorological software algorithms, and a high-capacity, processor-driven communications capability. NEXRAD initially developed as a tri-agency Program with NWS, FAA, and the DOD and evolved through coordinated sustaining engineering technology refresh efforts through a combined effort of the tri-agency's Radar Operations Center and the NEXRAD Product Improvement (NPI) Program, focusing on shared agency requirements to integrate synergistic life-cycle support solutions. The current NEXRAD system was fielded in the mid-1990s with an original design life of 20 years. However, the Federal government is 20-25 years away from full deployment of the next generation of weather radar design. Therefore, technology refresh efforts and strategic investments are critical to sustaining the availability of the NEXRAD fleet and to maximizing the benefit the NEXRAD network provides until the current network is replaced. In order to sustain the NEXRAD fleet until replacement radar can be fielded, the NWS embarked upon a WSR-88D Service Life Extension Program (SLEP) in FY 2015. The NEXRAD (WSR-88D) SLEP consists of four projects: Signal Processor Technology Refresh, Transmitter Technology Refresh, Antenna Pedestal Refurbishment, and Equipment Shelter Refurbishment.
- The Radar Observations Program will continue to invest in Dual Polarization technology to leverage the investment in the capability. The Dual Polarization algorithms must be tuned to geographical region climatology, while data quality must be addressed by continuous investment in calibration monitoring techniques and long-term system improvements.
- The existing NEXRAD network leverages other radar data sources such as the FAA's Terminal Doppler Weather Radar to supplement and gap fill the NEXRAD network.

Schedule and Milestones:

FY 2016

Signal Processor

- Complete formal testing, including beta field sites
- Begin deployment of new signal processors
- Modify 31 Field Signal Processers

Pedestal

- Release RFP for Pedestal Refurbishment Contract(s)

Transmitter

- Procure materials needed to refurbish transmitter cabinets and build new modulators
- Select vendor to provide Printed Wiring Board (PWB) replacement of transmitter backplane and consolidation of four Control and Monitoring CCAs
- Use parts to refurbish 4 transmitters to finalize procedures to be used by refurbishment contractor
- Prepare RFP for contractor to refurbish transmitters in the field

FY 2017

Signal Processor

- Modify 102 Field Signal Processers

Pedestal

- Issue solicitation for “full-service” contract to refurbish all WSR-88D Pedestals
- Rebuild 2 pedestals

Transmitter

- NRC begins full scale modulator modification
- Begin receiving new transmitter backplane PWBs and CCAs
- Award transmitter refurbishment contract and begin refurbishment at field sites
- Modify 3 transmitters

Shelter

- Release request for information (RFI) to solicit industry interest and capabilities

FY 2018

Signal Processor

- Complete deployment of Signal Processor Replacement modification

Pedestal

- Rebuild 29 pedestals

Transmitter

- Modify 12 transmitters

Shelter

- Develop RFP based on responses to RFI

FY 2019

Pedestal

- Rebuild 57 pedestals

Transmitter

- Modify 40 transmitters

Shelter

- Release RFP and award contracts
- Begin shelter refurbishment via contract
- Refurbish 9 shelters

Deliverables:

- New signal processor replacing obsolete hardware; implementation of new signal processor software replacing obsolete antenna control cards
- Totally refurbished pedestals with expected service life to at least 2030
- Totally refurbished transmitters with expected service life to at least 2030 Refurbished radar shelters

CENTRAL PROCESSING

The Central Processing PPA ensures the uninterrupted flow of information from the collection of observations to central guidance production to local applications of all essential weather and climate data products, and continuity of public watches and warnings.

Central Processing objectives are achieved through the following programs:

Weather and Climate Operational Supercomputing System provides support resources for (a) weather and climate forecasting capabilities 24 hours a day, 7 days a week, (b) numerical environmental prediction model development and testing, and (c) dissemination of operational products using a wide area network. Operational products include national and global weather, water, climate and space weather guidance, forecasts, warnings and analyses to a broad range of users and partners within NOAA, with other government agencies, military and the general public.

The NWS WCOSS is composed of primary and backup operational supercomputing systems, storage resources, wide area network, support services, and developmental computing systems, including resources for the NOAA HFIP activity. The Primary system runs the NCEP production suite. The backup is used to thoroughly test pre-production weather and climate forecasting applications when it is not being used to run the Production Suite during a backup system test or actual emergency. The backup supercomputer system is capable of handling 100 percent of the operational workload should the primary supercomputer system be disrupted. Implementation and maintenance of a redundant WCOSS architecture ensures uninterrupted flow of essential weather and climate data and products, continuity of storm watch and warning services to the public, and compliance with NOAA Critical Infrastructure Protection (CIP) plans.

WCOSS has been designated a Primary Mission Essential Function (PMEF) system, an essential government resource in the National Security Presidential Directive/NSPD 51 and Homeland Security Presidential Directive/HSPD 20. Funding provided in this program is critical to providing adequate security for this National Critical system.

This program also provides support for operating NOAA's research and development (R&D) supercomputer which serves as meteorological and climate test-beds and the Joint Center for Satellite Data Acquisition (JCSDA).

Advanced Weather Interactive Processing System is an information processing, display, and telecommunications system that is the cornerstone of NWS field operations. AWIPS provides the following services:

- Integrates and displays meteorological and hydrological data, satellite, and radar data at NWS field offices;
- Acquires and processes data from sensors and local sources;
- Provides computational and display functions at operational sites;

- Provides an interactive communications system to interconnect NWS operational sites;
- Initiates the dissemination of weather and flood warnings and forecasts in a rapid and highly reliable manner; and
- Provides the communication interface for internal and external users of much of NOAA's real-time environmental data.

Sustained investments in the AWIPS hardware, communications, and software infrastructure, are necessary for realizing return on NOAA investments in many other programs such as Next Generation Weather Radar, weather satellites, other weather radars, sensors, and instruments. NWS Government Performance and Results Act goals are based on the effective use of these technology investments along with advanced decision assistance tools, forecast preparation and advanced database capabilities. Continued AWIPS improvements produce increased performance in the NWS GPRA goals of Tornado Warning Lead Time, Flash Flood Warning Lead Time and Winter Storm Warning Lead Time goals.

An AWIPS program objective is to transform its service delivery to better align itself with the emerging needs of the Department of Homeland Security (DHS), FAA, emergency managers, decision makers, the American public and industry. Emergency managers, DHS, and industry are demanding increased lead time and more precision and consistency in weather, flood, and hurricane forecasts to improve their decisions for resource planning, evacuation planning, and business operations. These decisions are potentially lifesaving and can have multi-billion dollar impacts on the economy.

Schedule and Milestones:

FY 2016 – FY 2020

- Provide Operations and Maintenance support for WCOSS
- Provide Operations and Maintenance support for R&D High Performance Computing System
- Provide computational resources to support HFIP

FY 2017

- Prototype/define updated AWIPS hardware infrastructure
- National Centers AWIPS (NAWIPS) integration
- Improve collaboration capabilities among NWS operational units and NOAA trusted partners

FY 2018

- Implement Phase 3 upgrade of WCOSS
- Provide access to IDP services with AWIPS

FY 2019

- Development of integrated training capabilities within AWIPS infrastructure
- Phased implementation of new forecast tools and capabilities into AWIPS

FY 2020

- Phased implementation of new forecast tools and capabilities into AWIPS

Deliverables:

- Operational WCOSS with full backup capability
- Production Suite (NPS) On-Time Product Generation at 99 percent
- Operational Use Time at 99.9 percent
- Development Use Time at 99 percent
- Increase WCOSS capacity to 1.5 PF
- Streamline hardware architecture capability of meeting AWIPS performance requirements

- New forecast tools and capabilities for Impact-Based Decision Support Services/Weather Ready Nation operations
- Access to IDP services by AWIPS
- Weather Event Simulator integration into AWIPS

DISSEMINATION

To ensure a Weather-Ready Nation and optimize the delivery of scalable and agile dissemination capabilities, the Dissemination PPA is organized around infrastructure, networks and warning services.

Specifically within the PAC appropriation, the Dissemination PPA:

- Procures NWS' IT dissemination infrastructure and services
- Closes NWS' dissemination requirements and gaps
- Enhances NWS' dissemination system capabilities
- Build a scalable NWS dissemination architecture, consistent with and part of the emerging NOAA enterprise architecture.
- Develops a strategy to maximize effectiveness while minimizing cost

To achieve these goals, Dissemination manages the following programs:

NWS Telecommunications Gateway (NWSTG)

The NWSTG is the NWS communications hub for collecting and distributing weather data and products. NWSTG provides national and global collection and distribution of environmental data and forecast products to its field units and external users. Replacing the NWSTG functions with up-to-date technology will reduce the current delays in collecting and disseminating data by reducing data transit time through the NWSTG. The replacement will ensure reliable delivery of NWS products to users and will fully capitalize on better observation data and prediction models to improve services.

Timely, available, and accurate weather forecasts and warnings are critical to the health and well-being of the citizens and businesses in the United States and around the world. The NWSTG facilitates every NWS GPRA goal including: Tornado Warning Lead Time, Flash Flood Warning Lead Time, Winter Storm Warnings Lead Time, and Hurricane Track Forecasts. Weather and environmental disturbances have the potential to disrupt virtually every major public infrastructure system including transportation systems, power grids, telecommunications, and emergency response systems that protect the public. If any of the above were to occur, the effect on government would most probably come in the form of denial of service to the users of the services. Minutes (sometimes seconds) count in saving lives and the performance of the NWS dissemination systems to supply information needed is crucial. The NWSTG has been identified as an essential government resource in Presidential Decision Directive 67 – Enduring Constitutional Government and Continuity of Government Operations.

Complete and Sustain NOAA Weather Radio

NWS faces challenges in its efforts to sustain a high level of reliability and maintainability of NOAA Weather Radio (NWR), due to equipment obsolescence and degraded reliability. Four hundred (400) NWR station transmitters employ 1970's-installed vacuum tube technology from four different manufacturers. These older stations are less reliable than newer ones using solid-state transmitters. Older stations demonstrate mean time between failure (MTBF) rates of 6,000 hours, or one failure every 250 days. In comparison, newer solid-state transmitters

demonstrate MTBF of over 10,000 hours, a 67 percent improvement. Furthermore, stations have single points of failure due to configurations that include single, instead of dual, transmitters and lack of backup power generators to ensure continued service in the event of primary electrical service failure. Combined, these factors significantly decrease reliability and availability, and increase logistics and maintenance costs. Refurbishing these older stations and adequately funding operations and maintenance costs will allow NWR to meet expectations of availability as the Nation's weather and all hazard warning system. NWR is managed by the Dissemination PPA.

NWS will implement the NWR Console Replacement System (CRS) functions in the AWIPS-II at each of the 122 WFOs to sustain the NWS capability to quickly disseminate severe and high impact weather warnings, watches and forecasts and non-weather emergency messages to the public. NWS will implement the NOAA Weather Wire Service (NWWS) broadcast to emergency managers and other customers using the AWIPS Satellite Broadcast Network (SBN) to replace the service provided by the NWWS contractor.

Ground Readiness Project (GRP)

GRP will ensure utilization of the substantial increase in environmental satellite, radar, and model data that will improve weather warnings and forecasts. NOAA is in the midst of unprecedented advances in geostationary weather satellites, polar-orbiting satellites, satellite ground systems, and numerical weather prediction supercomputing systems. All of these advances are scheduled to come online in the 2015-2017 time-frame. Weather radar and other observational improvements will also continue in this time frame. Collectively, these satellite, model, and radar upgrades will result in an approximately three-fold data volume increase; far exceeding the capacity of NWS's current IT infrastructure to transmit the data to NWS forecast offices, between NWS systems, and to NWS customers. In order for the Nation to fully exploit and benefit from these multi-billion dollar investments, NWS's IT infrastructure must be enhanced: the new and improved satellite and radar products must be disseminated to the NWS modeling systems and forecasters, and the enhanced weather model outputs must be disseminated to NWS forecasters and forecast systems. Moreover, these advanced satellite and modeling products (more numerous and voluminous than their present-day counterparts) must be disseminated to NWS partners (e.g., industry and emergency management) and to the general public. NWS is thus updating its IT infrastructure with the GRP to ensure adequate processing, delivery and exploitation of new environmental satellite, model, and radar data. Without these upgrades, the intended improvements to the accuracy and timeliness of weather of weather warnings and forecasts will not be realized. The GRP will help ensure the full life- and property-saving potential of NOAA's satellite, model and radar investments will be achieved.

With GRP, NWS will take a holistic, enterprise-based approach to managing and integrating the necessary IT infrastructure redesign and upgrades. These IT infrastructure upgrades will allow the NWS to boost both data-processing and dissemination capabilities. NWS primary dissemination capabilities include both a SBN and extensive terrestrial communication circuits. The SBN is a key component of the NWS AWIPS communication network that feeds data to all NWS WFOs and RFCs nationwide and distributes information among these NWS sites, as well as provides for dissemination of information to the public and other outside users. Furthermore NWS direct readout (DRO) antennas will be enhanced to receive broadcasts from the new GOES-R series which has a data transmission rate roughly 13 times the previous generation satellite system. All of these IT infrastructure investments support and allow for improved weather warnings and forecasts.

Specific GRP activities, spanning multiple years, include:

- The build-out of NWS networks to field offices (including WFOs, RFCs, and National Centers) will continue. The build-outs will be for bandwidth enhancement, improved network availability, and improved network management. The build-outs will ensure that NWS field offices are connected to the NOAA Dissemination Infrastructure, which will enable the exchange of satellite, model, radar, and other data products among NWS field offices and with partners. The enhanced networks are necessary to support testing and then operations of NOAA's new satellites, models, and radar products.
- Based on the result of earlier (FY 2015) trade studies, it will be determined whether additional SBN bandwidth (i.e., an upgrade) is necessary and cost effective. Terrestrial network upgrades might alternatively be pursued based on technology costs and industry trends.
- Tests of new data and products from the GOES-R Series, the JPSS Series, and enhanced weather model outputs must be conducted. GRP will support the test planning, coordination, possible network reconfigurations (e.g., for routing), troubleshooting and resolution of test-identified issues.
- The final stages of satellite direct broadcast services will be completed (e.g., for the GOES-R and Himawari satellites), including the establishment of support mechanisms.

Schedule and Milestones:

FY 2016-2020:

- Procure final 80 transmitters
- Install remaining 181 transmitters
- Upgrade telecoms to digital Image and Publications System
- Replace obsolete transmitter site monitoring equipment
- Procure and install 240 antennas/coaxial cables
- Procure and install 160 generators
- Replace 133 Radio Frequency (RF) test meters
- Procure 138 RF signal analyzers
- Conduct transmitter O&M

Deliverables:

- 100 percent solid state transmitter network for all 1010+ stations
- Replacement of obsolete and end-of-life site components
- 96 percent or better station availability

The NWSTG and GRP schedule, milestones, deliverables, and out-year funding estimates are provided with the program change requested for this activity.

PROGRAM CHANGES FOR FY 2016:

Observations: Next Generation Weather Radar Service Life Extension Program (SLEP): (Base Funding: \$9,300,000 and 0 FTE; Program Change: +\$7,420,000 and 0 FTE): NOAA requests a planned increase of \$7,420,000 and 0 FTE for a total of \$16,720,000 and 0 FTE to continue implementation of a SLEP to sustain the aging NEXRAD infrastructure that underpins severe weather forecast and warning services for high-impact events critical for a Weather-Ready Nation. This is a multi-year effort that began in FY 2015 and is anticipated to be completed in 2022.

Proposed Actions:

The NEXRAD SLEP initially focuses on replacing soon to be obsolete receivers and signal processors. This proposed increase in FY 2016 will continue to fund the radar receiver and signal processor technology refresh supported in the FY 2015 Enacted, and will begin addressing radar pedestal and transmitter refurbishment.

Provided below is information on the activities that will be conducted in FY 2016.

- **Radar Receiver and Signal Processor Technology Refresh:** New signal processing replacement hardware will be delivered beginning in FY 2016 and completed by FY 2018. At the same time, new software will be developed to provide antenna control functionality in the new signal processor hardware, thus eliminating obsolete antenna control circuit cards. Kits will be shipped from the National Reconditioning Center (NRC) to field beta test sites for installation by local maintenance personnel with assistance from a Depot Team.
- **Radar Pedestal Refurbishment:** Procurement preparations will begin in FY 2016, with multiple contracts awarded in FY 2017. Refurbishment work will begin in FY 2017 and conclude in FY 2022.
- **Transmitter Refurbishment:** Procurement activities will begin in FY 2016 to purchase materials needed to refurbish transmitter cabinets and build new modulators. Transmitter refurbishment will begin FY 2017 and conclude in FY 2022.

NWS' 122 operational NEXRADs were fielded in the mid-1990s with an original design life of 20 years. A SLEP is required to extend the useful life of the radars and enable continual performance improvements in weather forecast and warning services until the next generation of weather radars is identified, developed, and deployed. A SLEP will extend the useful life of the NEXRAD array by approximately 15 years. Refurbishing the existing system is a cost effective approach to preserving this \$3.1 billion capital investment.⁴ Failure to invest in the SLEP at this time would lead to significant outages causing regional radar gaps, and would greatly increase risk to the NWS warning mission and Department of Transportation (DOT) and DOD missions.

Approximately 85 percent of all tornado warnings are based on radar detections. The new signal processor hardware introduced by SLEP will greatly increase processing speed, supporting immediate implementation of advanced radar signal processing algorithms providing improved sensitivity and sampling rates of precipitation elements ultimately resulting in increased NWS GPRA Tornado Warnings Lead Time performance.

⁴ Derived from "The Federal Plan for Meteorological Services and Supporting Research", FY 1980-2000.

This request supports the development of a Weather-Ready Nation that is more resilient and able to prepare for and respond to weather, climate, and environmental events that affect safety, health, the environment, economy, and homeland security. Investment in this SLEP mitigates high operational risk by extending the useful life of the radars. Without this investment, NEXRAD availability will degrade rapidly beginning in 2020 resulting in long-duration radar outages and regional radar gaps; these radar gaps would negatively impact our ability to provide tornado and flash flood warnings.

Statement of Need and Economic Benefits:

In 2011, severe weather caused over \$29 billion of economic losses and contributed to hundreds of deaths.⁵ The primary tool used by NOAA's meteorologists for issuing warnings for flash floods, tornadoes and severe thunderstorms is the NEXRAD. NEXRAD data have become integrated into America's decision support serving air traffic management, homeland security, military operations, emergency managers, and water resource management. NEXRAD data is vital to many sectors of the economy including the public media, tourism, agriculture, transportation, and energy production. The current NEXRAD system was fielded in the mid-1990s with an original design life of 20 years. However, the United States is still 20-25 years away from full deployment of its next generation weather radar. Therefore, technology refresh efforts and strategic investments are critical to sustaining the availability of the NEXRAD fleet and to maximizing the benefit the NEXRAD network provides until the current network is replaced.

An independent assessment of the benefits of the NEXRAD radars concluded that the introduction of the NEXRAD radar network allowed NWS to increase by 70 percent the number of tornadoes warned in advance and increased the warning lead time on all tornadoes by 80 percent. This has led to a 45 percent reduction in tornado related fatalities and a 40 percent reduction in tornado related injuries.

Tornado warnings lead time performance will be improved through new signal processing techniques enabled by the new signal processor hardware introduced by this service life extension. Specifically, Whitening and Oversampling (introduced in FY 2016-2018) allow faster antenna rotation while improving data quality and adding more frequent scans of the lower atmosphere to better detect quick developing and short-lived tornadoes.

Resource Assessment:

The current resources for this activity are described in the Observations narrative. The NEXRAD Product Improvement (PI) program was re-established to support NEXRAD SLEP. NEXRAD SLEP is a multi-year project with focused program activities every year that are dependent on additional resources to continue the SLEP.

Schedule and Milestones:

FY 2016

Signal Processor

- Complete formal testing, including beta field sites
- Begin deployment of new signal processors
- Modify 31 Field Signal Processors

Pedestal

- Release RFP for Pedestal Refurbishment Contract(s)

⁵ NOAA/National Climatic data Center, <http://www.ncdc.noaa.gov/billions/events.pdf>

Transmitter

- Procure materials needed to build new modulators
- Select vendor to provide Printed Wiring Board (PWB) replacement of transmitter backplane and consolidation of four Control and Monitoring Circuit Card Assemblies (CCAs)
- Use parts to refurbish 4 transmitters to finalize procedures to be used by refurbishment contractor
- Prepare RFP for contract to refurbish transmitters in the field

FY 2017

Signal Processor

- Modify 102 Field Signal Processors

Pedestal

- Issue solicitation for “full-service” contract to refurbish all WSR-88D Pedestals
- Rebuild 2 pedestals

Transmitter

- NRC begins full scale modulator modification
- Begin receiving new transmitter backplane PWBs and CCAs
- Award transmitter refurbishment contract and begin refurbishment at field sites
- Modify 3 transmitters

Shelter

- Release request for information (RFI) to solicit industry interest and capabilities

FY 2018

Signal Processor

- Complete deployment of Signal Processor Replacement modification

Pedestal

- Rebuild 29 pedestals

Transmitter

- Modify 12 transmitters

Shelter

- Develop RFP based on responses to RFI

FY 2019

Pedestal

- Rebuild 57 pedestals

Transmitter

- Modify 40 transmitters

Shelter

- Release RFP and award contracts
- Begin shelter refurbishment via contract
- Refurbish shelters at 9 radar sites

FY 2020

Pedestal

- Rebuild 60 pedestals

Transmitter

- Modify 55 transmitters

Shelter

- Release RFP and award contracts
- Begin shelter refurbishment via contract
- Refurbish shelters at 9 radar sites

Deliverables:

- New signal processor replacing obsolete hardware
- Totally refurbished pedestals with expected service life to at least 2030
- Totally refurbished transmitters with expected service life to at least 2030
- Refurbished radar shelters

Performance Goals and Measurement Data:

Performance Measure:	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
NEXRAD service availability (%)							
With Increase	N/A	N/A	96%	96%	96%	96%	96%
Without Increase	99.7%	96%	96%	96%	96%	96%	94%
Description: Engineering and logistics analyses have shown that NEXRAD service availability will fall rapidly below 96 percent beginning in 2020 without a SLEP investment, resulting in long-duration outages and regional radar coverage gaps. The goal of SLEP is to prevent this decrease and sustain service availability above 96 percent through at least 2030.							

Out year Funding Estimates (\$ in thousands):

Observations	FY 2015 & Prior	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	CTC	Total
Change from FY 2016 Base		7,420	15,955	13,653	3,609	2,899	N/A	
Total Request	29,742	16,720	25,255	22,953	12,909	12,199	N/A	Recurring

Out years are estimates only. Future requests will be determined through the annual budget process.

*Includes Disaster Relief Appropriations Act, 2013.

**FY 2015 & Prior is back to FY 2013

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: National Weather Service
Sub-program: Systems Acquisition
Program Change: NEXRAD Service Life Extension Program

Object Class	FY 2016 Increase	FY 2016 Total Program
11 Personnel compensation		
11.1 Full-time permanent	\$0	\$0
11.3 Other than full-time permanent	0	0
11.5 Other personnel compensation	0	0
11.6 Leave Surcharge Full-Time	0	0
11.8 Special personnel services payments	0	0
11.9 Total personnel compensation	0	0
12 Civilian personnel benefits	0	0
13 Benefits for former personnel	0	0
21 Travel and transportation of persons	0	110
22 Transportation of things	0	3
23.1 Rental payments to GSA	0	0
23.2 Rental Payments to others	0	0
23.3 Communications, utilities and misc charges	0	525
24 Printing and reproduction	0	0
25.1 Advisory and assistance services	0	1,450
25.2 Other services	500	1,734
25.3 Purchases of goods & services from Gov't accounts	0	290
25.4 Operation and maintenance of facilities	0	0
25.5 Research and development contracts	0	0
25.6 Medical care	0	0
25.7 Operation and maintenance of equipment	0	0
25.8 Subsistence and support of persons	0	0
26 Supplies and materials	6,920	12,420
31 Equipment	0	132
32 Lands and structures	0	0
33 Investments and loans	0	0
41 Grants, subsidies and contributions	0	56
42 Insurance claims and indemnities	0	0
43 Interest and dividends	0	0
44 Refunds	0	0
99 Total obligations	7,420	16,720

Central Processing: Sustain Weather and Climate Supercomputing: (Base Funding: \$43,908,000 and 0 FTE; Program Change: \$1,761,000 and 0 FTE): NOAA requests an increase of \$1,761,000 and 0 FTE for a total of \$44,169,000 and 0 FTE for the continued procurement and operations and maintenance (O&M) of NOAA's WCOSS. In 2015, NOAA is acquiring additional WCOSS capacity to accommodate the growing demand for critical forecast products and which will result in improved skill and reduced error in NOAA's operational numerical forecasts. This funding is required for NWS to ensure adequate O&M resources for this increased capacity, to effectively produce timely and accurate forecasts and warnings as well as restores FY 2016 funding to the levels included in the FY 2015 President's Budget.

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: National Weather Service
Sub-program: Systems Acquisition
Program Change: Sustain Weather and Climate Supercomputing

Object Class		FY 2016 Increase	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$2,683
11.3	Other than full-time permanent	0	75
11.5	Other personnel compensation	0	35
11.6	Leave Surcharge Full-Time	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	0	2,793
12	Civilian personnel benefits	0	762
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	79
22	Transportation of things	0	1
23.1	Rental payments to GSA	0	517
23.2	Rental Payments to others	0	421
23.3	Communications, utilities and misc charges	0	2,373
24	Printing and reproduction	0	0
25.1	Advisory and assistance services	1,761	43,101
25.2	Other services	0	40
25.3	Purchases of goods & services from Gov't accounts	0	64
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	6
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	305
31	Equipment	0	13,252
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	2,047
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	1,761	65,761

Due to financial system limitations, the object class detail for the Program reflects the Central Processing PPA.

Central Processing: Slow Advanced Weather Interactive Processing System (AWIPS) II Extended: (Base Funding: \$21,592,000 and 22 FTE; Program Change: -\$1,500,000 and 0 FTE): NOAA requests a decrease of \$1,500,000 and 0 FTE for a total of \$20,092,000 and 22 FTE for AWIPS Technology Infusion.

Proposed Action:

NOAA proposes to slow development and implementation of new tools and capabilities aimed at achieving the NWS Future Forecast Office operations. In FY 2016, this will defer the implementation of the AWIPS Weather Event Simulator (WES) application from FY 2016 to FY 2017. The WES application, a comprehensive training capability, will enable NWS forecasters to develop and sustain AWIPS' product and service dissemination skills. WES integration into the operational AWIPS baseline will also allow forecasters to more effectively utilize new Weather-Ready Nation capabilities as they are added to the AWIPS infrastructure.

Remaining funds will support more critical NWS Future Forecast Office operations projects, some of which are listed in the Schedule and Milestones below. NWS Future Forecast Office operations will improve situational awareness during weather events by reducing the time forecasters spend on the production of forecast products and information in order to spend more time supporting Impact-Based Decision Support Services (IDSS).

A reduction to AWIPS will delay future development work associated with new tools and capabilities aimed at improved decision support services to transform NWS' service delivery functions. NWS will be limited in providing future tools and capabilities which meteorologists/hydrologists use in situational awareness for warning/forecast preparation to better align with the emerging needs of a Weather-Ready Nation. The development of robust, efficient service backup capabilities to support local needs as well as COOP activities will also be deferred.

Resource Assessment:

Current resources are used to add new and improved functionalities and capabilities for NWS field forecasters, NOAA partners and the public to address existing and emerging NWS mission requirements. AWIPS II Extended will add new capabilities to more effectively access data providers (data delivery), improve collaboration capabilities to support collaboration among NWS operational units and NOAA trusted partners, improve means to generate information to support decision makers, and improve ways for forecasters to access and visualize meteorological information. Sustained investments in the AWIPS hardware, communications, and software infrastructure, are necessary for realizing return on NOAA investments in many other programs such as NEXRAD, weather satellites, other weather radars, sensors, and instruments. NWS Government Performance and Results Act goals are based on the effective use of these technology investments along with advanced decision assistance tools, forecast preparation and advanced database capabilities. Improvements in NWS Tornado Warning Lead Time, Flash Flood Warning Lead Time and Winter Storm Warning Lead Time goals can only be realized with continued support of, and improvements to AWIPS using new and improved science, and exploiting more accurate and higher resolution data and weather forecast model information.

Schedule and Milestones:

FY 2016-2020:

- Continue to implement new forecast tools and capabilities, but at a slower rate

Deliverables:

- New forecast tools and capabilities for Future Forecast Office operations
- Implementation of IDSS
- New data delivery methods
- WES integration into AWIPS

Performance Goals and Measurement Data:

Performance Measure:	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
Annual number of new capabilities or products introduced into field operations							
With Decrease	N/A	N/A	8-18	8-18	8-18	8-18	8-18
Without Decrease	6	10-20	10-20	10-20	10-20	10-20	10-20
Description: AWIPS II Extended will add new capabilities and products to sustain operations and more effectively access and process data, resulting in better forecasts and warning. This performance measure reflects the number of capabilities and products NWS transitions into field operations per year.							

Outyear Funding Estimates (\$ in thousands):

Central Processing	FY 2015 & Prior	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	CTC	Total
Change from FY 2016 Base		(1,500)	(1,500)	(1,500)	(1,500)	(1,500)	N/A	
Total Request	209,618	64,261	64,261	64,261	64,261	64,261	N/A	Recurring

Outyears are estimates only. Future requests will be determined through the annual budget process.

*Includes Disaster Relief Appropriations Act, 2013.

**FY 2015 & Prior is back to FY 2013

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: National Weather Service
Sub-program: Systems Acquisition
Program Change: Slow Advanced Weather Interactive Processing System II Extended

Object Class	FY 2016 Decrease	FY 2016 Total Program
11 Personnel compensation		
11.1 Full-time permanent	\$0	\$2,683
11.3 Other than full-time permanent	0	75
11.5 Other personnel compensation	0	35
11.6 Leave Surcharge Full-Time	0	0
11.8 Special personnel services payments	0	0
11.9 Total personnel compensation	0	2,793
12 Civilian personnel benefits	0	762
13 Benefits for former personnel	0	0
21 Travel and transportation of persons	0	79
22 Transportation of things	0	1
23.1 Rental payments to GSA	0	517
23.2 Rental Payments to others	0	421
23.3 Communications, utilities and misc charges	0	2,373
24 Printing and reproduction	0	0
25.1 Advisory and assistance services	(1,500)	39,840
25.2 Other services	0	40
25.3 Purchases of goods & services from Gov't accounts	0	64
25.4 Operation and maintenance of facilities	0	0
25.5 Research and development contracts	0	6
25.6 Medical care	0	0
25.7 Operation and maintenance of equipment	0	0
25.8 Subsistence and support of persons	0	0
26 Supplies and materials	0	305
31 Equipment	0	13,252
32 Lands and structures	0	0
33 Investments and loans	0	0
41 Grants, subsidies and contributions	0	2,047
42 Insurance claims and indemnities	0	0
43 Interest and dividends	0	0
44 Refunds	0	0
99 Total obligations	(1,500)	62,500

Due to financial system limitations, the object class detail for the Program reflects the Central Processing PPA.

Dissemination: Improve Dissemination Reliability: (Base Funding: \$0 and 0 FTE; Program Change: \$9,700,000 and 0 FTE): NOAA requests an increase of \$9,700,000 and 0 FTE for a total of \$9,700,000 and 0 FTE to reinvest the planned project reduction for NWS Telecommunications Gateway (NWSTG) in the upgrade of network capabilities to reduce single points of failure and increase website capacity to NWS Field Offices.

Proposed Action:

This request will provide NWS Field Offices with reliable communication networks and robust websites mitigating risk to mission operations during severe weather events. The Field Office's communication networks and websites are essential components to the organization's mission of disseminating forecasts, warnings, and outlooks. There is a vital need for additional capacity to keep up with the growing demand for services and to reduce outages during severe weather events. Many of the field networks and websites are built with little or no redundancy, resulting in single points of failure and capacity issues across the Nation. In 2013 and 2014, these issues resulted in numerous outages, delaying NWS' ability to disseminate its forecasts and warnings to emergency managers, first responders, and the public. This continued investment in NWS' Dissemination portfolio will allow the organization to acquire alternate communication paths to its Field Offices and increase website capacity to the greatest extent possible by consolidating Field Office websites to the primary and backup NWS operational integrated dissemination infrastructure sites located in College Park, Maryland (MD) and Boulder, Colorado (CO). This activity reinvests the planned project decrease for the NWSTG in order to upgrade NWS' dissemination infrastructure as part of NOAA's effort to make the NWS' network infrastructure more resilient and robust while decreasing the likelihood of network outages.

Activities that will be conducted in FY 2016 include:

- **Reducing Single Points of Failure:** Acquire robust and reliable networking capabilities which would include upgrading networking lines, including aging copper lines with fiber optics and providing two physical network paths to each NWS Field office building, reducing single points of failure.
- **Providing Robust and High Capacity Websites:** Provide robust and high capacity websites for NWS Field Offices at the primary (College Park, MD) and back-up (Boulder, CO) integrated dissemination sites to ensure the Field Office websites keep up with growing requirements and increased use during severe weather events. This investment will acquire computing and storage to augment the IT dissemination infrastructure currently being stood-up at the primary and back-up sites providing 100 percent backup capabilities.

This is a two year initiative which will be implemented in phases occurring in FY 2016 and FY 2017.

Continued investment in Dissemination will mitigate high operational and safety risks to NWS and NOAA by ensuring Field Offices have upgraded and alternate network paths and increased website capacity giving the organization the ability to meet its mission to protect life and property and enhance the national economy. Reducing single points of failure and addressing website capacity issues is essential for NWS Field Offices to continue providing critical dissemination of timely weather, climate, and hydrologic products to and from thousands of customers worldwide without disruption to mission operations during severe weather events. NOAA believes that the cost of continued investment in NWS' dissemination networks far outweigh the severe safety, reputation, performance, and compliance risks of not pursuing this upgrade.

Statement of Need and Economic Benefits:

Providing the Field Offices with a more reliable communications network and robust websites has not been addressed to-date. However; the 2013 and 2014 single points of failures and capacity issues that caused significant outages, which is a risk to the organization's mission of dissemination of warnings and forecasts, indicate upgrading the field network and infrastructure is critical. One example of an outage was in December 2013; a large and complex storm system produced hazardous weather from northern New England to the Southern Plains and Southeast. The weather system had elements of icing, heavy snow, severe thunderstorms, flooding and tornadoes. During this hazardous weather event, NWS experience six disparate and geographical non-juxtaposed dissemination outages which significantly impacted NWS operations on a Nation-wide scale.

In FY 2015, NWS reorganized its budget and organizational structure into portfolios and the Dissemination portfolio is strategically positioned to deliver capabilities needed by the NWS Field offices to address dissemination deficiencies and help realize the value of billions of dollars invested with new weather satellite systems, supercomputer enhancements and radar life extensions.

Resource Assessment:

Current Dissemination resources are used to re-architect the NWSTG and to prepare NWS for satellite, model and radar ground readiness through its Ground Readiness Project (GRP) program. Additionally, current funding supports telecommunication circuits costs and as-needed corrective maintenance. Current Dissemination resources do not cover the field networks and field websites and will not address these systems' needs.

Schedule and Milestones:

FY 2016

- Acquire alternate communication paths to the NWS Field offices including upgrading aging copper lines with fiber optics and providing two physical network paths to each NWS Field office building
- Acquire additional computing and storage at the operational integrated dissemination infrastructure primary and back-up sites
- Begin integration of NWS Field Office websites to College Park, MD and Boulder, CO

FY 2017

- Complete alternate communication paths to the NWS Field offices
- Complete additional computing and storage at the operational integrated dissemination infrastructure primary and back-up sites
- Complete integration of websites for NWS Field Offices to College Park, MD and Boulder, CO

Deliverables:

- Reliable and robust networks for all NWS Field Offices
- Robust and high capacity Websites for NWS Field Offices

Performance Goals and Measurement Data:

Performance Measure:	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
Annual major outages during severe weather events							
With Increase	N/A	N/A	10	6	4	4	4
Without Increase	12	12	14	17	20	25	30
Description: This performance metric measures major Field Office outages (network single points of failure and websites failures) that could possibly occur annually during severe weather events. Failing to address network single points of failure and capacity issues along with growing requirements and increased use of websites during severe weather events, NWS estimates that major outages will increase to 30 annually by 2020 without the reinvestment.							

Out year Funding Estimates (\$ in thousands):

Dissemination	FY 2015 & Prior	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	CTC	Total
Change from FY 2016 Base		9,700	9,700	0	0	0	19,400	19,400
Total Request	104,353	45,684	35,335	24,919	24,919	24,919	N/A	Recurring

Out years are estimates only. Future requests will be determined through the annual budget process.

*Includes Disaster Relief Appropriations Act, 2013.

**FY 2015 & Prior is back to FY 2013

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: National Weather Service
Sub-program: Systems Acquisition
Program Change: Improve Dissemination Reliability

Object Class	FY 2016 Increase	FY 2016 Total Program
11 Personnel compensation		
11.1 Full-time permanent	\$0	\$0
11.3 Other than full-time permanent	0	0
11.5 Other personnel compensation	0	0
11.6 Leave Surcharge Full-Time	0	0
11.8 Special personnel services payments	0	0
11.9 Total personnel compensation	0	0
12 Civilian personnel benefits	0	0
13 Benefits for former personnel	0	0
21 Travel and transportation of persons	0	73
22 Transportation of things	0	13
23.1 Rental payments to GSA	0	9
23.2 Rental Payments to others	0	0
23.3 Communications, utilities and misc charges	0	3,779
24 Printing and reproduction	0	0
25.1 Advisory and assistance services	9,700	36,066
25.2 Other services	0	4,767
25.3 Purchases of goods & services from Gov't accounts	0	326
25.4 Operation and maintenance of facilities	0	0
25.5 Research and development contracts	0	0
25.6 Medical care	0	0
25.7 Operation and maintenance of equipment	0	0
25.8 Subsistence and support of persons	0	0
26 Supplies and materials	0	1,780
31 Equipment	0	7,887
32 Lands and structures	0	0
33 Investments and loans	0	0
41 Grants, subsidies and contributions	0	0
42 Insurance claims and indemnities	0	0
43 Interest and dividends	0	0
44 Refunds	0	0
99 Total obligations	0	0
44 Refunds	0	0
99 Total obligations	9,700	54,700

Due to financial system limitations, the object class detail for the Program reflects the Dissemination PPA.

Dissemination: Ground Readiness Project: (Base Funding: \$18,191,000 and 0 FTE; Program Change: +\$1,400,000 and 0 FTE): NOAA requests an increase of \$1,400,000 and 0 FTE for a total of \$19,591,000 and 0 FTE to ensure utilization of the substantial increase in environmental satellite, radar, and model data that will improve weather warnings and forecasts.

Proposed Action:

The NWS Ground Readiness Project (GRP) investment is critical to the continued evolution of the NWS as it will prepare NOAA for the three-fold increase in data volume expected from new environmental satellites as well as increased data from models and radar. The expected increase in critical environmental data far exceeds the capacity of the organization's current IT infrastructure. GRP will ensure that NOAA will be able to process, distribute, store and utilize new GOES-R space weather information necessary for its space-weather forecasting responsibilities. To fully exploit and benefit from these new observations and products, NWS must upgrade and enhance its IT infrastructure.

In FY 2016, the following capabilities will be delivered:

- **Network Enhancements to Field Offices:** NOAA will use funds to continue the build-out of NWS networks to field offices, including WFOs, RFCs, and National Centers. The build-outs will be for bandwidth enhancement, improved network availability/reliability and network management, increased security, and improved inter-agency network connections. The build-outs will ensure that NWS field offices are connected to the NOAA Dissemination Infrastructure, which will enable the exchange of satellite, model, radar, and other data products among NWS field offices and NOAA partners. The enhanced networks are necessary to support GOES-R launch testing, pre-launch testing for upcoming satellites GOES-S and Joint Polar Satellite System -1 (JPSS-1) (whose launches are scheduled for FY 2017), improved/expanded numerical model products from the NOAA Weather and Climate Operational Supercomputer System (WCOSS), enhanced weather radar products, and the products generated by NWS Field Offices.
- **GOES-R and Other New Product Testing:** NOAA will use funds for verification and validation testing of GOES-R and other new flows into NWS systems before and after the GOES-R launch and during and after the FY 2015/2016 WCOSS upgrade. These tests require planning, coordination, network configurations such as for routing, possible software enhancements at telecommunications hubs, troubleshooting and resolution of test-identified issues, and reporting.
- **Space weather science algorithm/software/monitoring and archive support:** NOAA will use funds to transition developmental GOES-R Level 2+ space weather science algorithms (which derive necessary geophysical variables from the input satellite data) to an operationally-ready state. Funding is also needed to manage the official NOAA archive of GOES-R Level 2+ space weather products. This includes the public dissemination of archived data; maintenance of the Satellite Products Analysis and Distribution Enterprise System (SPADES) to support algorithm updates and sensor operations & maintenance; support transition of GOES-R Level 2+ space weather algorithms to NWS systems (configuration control and algorithm management); and provide daily monitoring of GOES-R space weather sensor product performance (periodic calibration updates and as-needed anomaly resolution).
- **Space weather IT infrastructure and system-level support:** NOAA will use funds to acquire the hardware and telecommunications equipment needed for space weather processing, storage, and distribution. This includes NOAA dissemination infrastructure upgrades (e.g., servers and networks) that will be necessary to host and operate the space weather science algorithms and to make the outputs available to the NWS Space Weather Prediction Center,

the archive system, and other users. This also includes the provision of system-level monitoring and support.

Statement of Need and Economic Benefits:

This investment will continue to enable NWS to better meet the requirements of local, state, and Federal first responders, emergency managers, the private-weather industry, and decision-makers for significantly refined warnings and forecasts, and ensure a Weather-Ready Nation. In particular, new satellite data and processing capabilities will improve forecasts from the county/multi-town scale to the neighborhood scale, and in some cases, even street level. The activities proposed in this initiative will continue to ensure that NWS and partner decision makers will be able to exploit new satellite, radar and model data, and leverage the new GOES-R space weather instrument outputs. This will result in more refined, reliable, and advanced notice of deadly weather events by improving tornado and other lead times, and by reducing false alarm rates, which helps to save lives. This will also result in improving the quality and timeliness of NOAA's space-weather watches, warnings and alerts, thus helping to guard against and/or mitigate the effects of solar flares, energetic charged particles, and CMEs that can result in deleterious geomagnetic storms, radio communication blackouts, increased radiation exposure by astronauts, and other impactful events.

Resource Assessment:

Current resources are used to prepare NWS for satellite, model and radar ground readiness. Specifically, the NWS' dissemination and IT infrastructure will be enhanced. The capabilities delivered will allow NWS to significantly improve upon current methods of processing and distribution of environmental satellite, radar, and model data, enabling the exploitation of data from new sensor and modeling systems. Upgrades will improve reliability and increase networking bandwidth to WFOs, RFCs, and National Centers, NWS Headquarters development and test beds, and training centers to support increases in data volume. Additional resources are needed to transition satellite-related space weather products into operations and acquire hardware and telecommunications equipment for these products.

Schedule and Milestones:

FY 2016

- Support GOES-R launch readiness and post-launch testing
- Complete final testing for (and begin sustainment of) direct readout antenna upgrades and related product generation
- Deliver and sustain networking upgrade and ground readiness functionality
- Continue to upgrade and optimize NWS networks and communications infrastructure in preparation for GOES-S, JPSS, new model and radar products
- Establish an initial operational capability (IOC) for GOES-R-era space weather products including operational-grade space weather science algorithm software, science monitoring, archive support, and the IT infrastructure and system-level support needed to host/operate the processing software and to disseminate products to decision makers at the NOAA Space Weather Prediction Center, to partner organizations, and to other users

FY 2017

- Conduct needed refresh and operations and maintenance activities as new satellite, model and radar data sets become available. Includes conducting JPSS readiness testing activities
- Conduct overall network and communication infrastructure upgrade, maintenance and improvement activities
- Continued GOES-S and JPSS pre- and post-launch testing

FY 2018

- Conduct needed refresh and operation and maintenance activities as new satellite, model and radar data sets become available
- Conduct overall network and communications infrastructure maintenance and improvement activities

FY 2019

- Conduct needed refresh and operation and maintenance activities as new satellite, model and radar data sets become available
- Conduct overall network and communications infrastructure maintenance and improvement activities

FY 2020

- Conduct needed refresh and operation and maintenance activities as new satellite, model and radar data sets become available
- Conduct overall network and communications infrastructure maintenance and improvement activities

Deliverables:

- Improved NWS networking and communications infrastructure reliability and increased terrestrial and satellite telecommunications bandwidth
- GOES-R Rebroadcast (GRB) antennas and product generation capabilities

Performance Goals and Measurement Data:

Performance Measure:	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
Percent (%) of mission required satellite data processed and distributed within targeted time							
With Increase	N/A	N/A	98.5%	98.5%	98.5%	98.5%	98.5%
Without Increase	90%	98.5%	90.5%	90.5%	90.5%	90.5%	90.5%
<p>Description: The without increase targets reflect the reduction in availability of satellite and model data attributable to network upgrades that would not be made. Model and Suomi-National Polar Orbiting Partnership data would be reduced in FY 2015 due to some full resolution products being unavailable at field sites. Emerging critical space-weather requirements in the FY 2016 time frame would not be met (i.e., space weather processing and archive would not take place on a fully-operational, fully-supported, fully secured, high availability, backed-up platform). GOES-R and JPSS would have reduced availability by FY 2017 if NWS remains at legacy capability. The without increase target data are high level estimates based upon the ratio of legacy data to the full data set that each satellite and improved models will bring.</p>							

Out year Funding Estimates (\$ in thousands):

Dissemination	FY 2015 & Prior	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	CTC	Total
Change from FY 2016 Base		1,400	(2,061)	(2,061)	(2,061)	(2,061)	N/A	
Total Request	104,353	45,684	35,335	24,919	24,919	24,919	N/A	Recurring

Out years are estimates only. Future requests will be determined through the annual budget process.

*Includes Disaster Relief Appropriations Act, 2013.

**FY 2015 & Prior is back to FY 2013

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: National Weather Service
Sub-program: Systems Acquisition
Program Change: Ground Readiness Project

Object Class	FY 2016 Increase	FY 2016 Total Program
11 Personnel compensation		
11.1 Full-time permanent	\$0	\$0
11.3 Other than full-time permanent	0	0
11.5 Other personnel compensation	0	0
11.6 Leave Surcharge Full-Time	0	0
11.8 Special personnel services payments	0	0
11.9 Total personnel compensation	0	0
12 Civilian personnel benefits	0	0
13 Benefits for former personnel	0	0
21 Travel and transportation of persons	0	73
22 Transportation of things	0	13
23.1 Rental payments to GSA	0	9
23.2 Rental Payments to others	0	0
23.3 Communications, utilities and misc charges	0	3,779
24 Printing and reproduction	0	0
25.1 Advisory and assistance services	1,400	27,766
25.2 Other services	0	4,767
25.3 Purchases of goods & services from Gov't accounts	0	326
25.4 Operation and maintenance of facilities	0	0
25.5 Research and development contracts	0	0
25.6 Medical care	0	0
25.7 Operation and maintenance of equipment	0	0
25.8 Subsistence and support of persons	0	0
26 Supplies and materials	0	1,780
31 Equipment	0	7,887
32 Lands and structures	0	0
33 Investments and loans	0	0
41 Grants, subsidies and contributions	0	0
42 Insurance claims and indemnities	0	0
43 Interest and dividends	0	0
44 Refunds	0	0
99 Total obligations	0	0
44 Refunds	0	0
99 Total obligations	1,400	46,400

Due to financial system limitations, the object class detail for the Program reflects the Dissemination PPA.

Dissemination: Re-architected NWS Telecommunications Gateway: (Base Funding: \$21,215,000 and 0 FTE; Program Change: -\$10,416,000 and 0 FTE): NWS requests a planned reduction of \$10,146,000 and 0 FTE for a total of \$10,799,000 and 0 FTE to reflect the planned completion in FY 2016 of a re-architected National Weather Services (NWS) Telecommunications Gateway (NWSTG) at the primary and backup site. The re-architected NWSTG capability will ensure modern, scalable, extensible, and reliable dissemination and infrastructure services using current best practices. The funding reduction in FY 2016 associated with the planned project decrease for the NWSTG will be reinvested in FY 2016 to upgrade NWS' dissemination infrastructure as part of NOAA's effort to make the NWS' network infrastructure more resilient and robust while decreasing the likelihood of network outages.

Proposed Action:

A re-architected NWSTG fully eliminates this program as a single point of failure for the collection and dissemination of timely weather, climate, and hydrologic products. Improvements to the dissemination IT infrastructure primary and backup sites ensure NOAA will be poised to accommodate future data volumes driven by increased satellite, numerical model data and climate observations and other requirements, and to maintain system integrity and reliability. Increases in environmental data volume are expected from:

- New satellites (e.g. GOES-R and Joint Polar Satellite System (JPSS));
- Increases in environmental model prediction capabilities including High-Resolution Rapid Refresh (HRRR), higher resolution global ensembles, and higher resolution short range ensembles; and
- Radar data.

NOAA will complete and test a re-architected NWSTG in FY 2016, with the aim to make it operational by FY 2017. The funding reduction in FY 2016 associated with the planned project decrease for the NWSTG will be reinvested in FY 2016 to upgrade NWS' dissemination infrastructure as part of NOAA's effort to make the NWS' network infrastructure more resilient and robust while decreasing the likelihood of network outages. Additional information on the proposed reinvestment can be found in the "Upgrade Dissemination Infrastructure" program change. NWSTG is a multi-year project that started with funding in FY 2013. Reduced funding in FY 2018 and beyond will support the operations and maintenance of NWSTG.

Resource Assessment:

Current resources are used to re-architect the NWSTG and its backup to ensure a modern, scalable, extensible, and reliable system using current best practices. This includes the implementation and transition of NWSTG functions into a new operational dissemination architecture, allowing the revamped NWSTG to ingest and disseminate new and improved satellite, model and radar data. Additionally, current funding supports telecommunication circuits costs, NWS websites and dissemination systems, and ad hoc corrective maintenance. The requested level of resources in FY 2016 is required to complete this critical program, which will allow high availability of dissemination services through a fully redundant backup system.

Schedule and Milestones:

FY 2016

- Provide NWSTG re-architected capabilities at dissemination IT infrastructure backup site
- Complete full testing of fail-over capabilities between IT infrastructure primary and backup site
- Complete full testing of 24x7 operational NSWTG re-architected monitoring, and problem response and resolution capabilities

- Complete IT security Authority to Operate (ATO)
- Complete training of support staff
- Complete full operational NWSSTG re-architected capabilities at dissemination IT infrastructure primary and backup site

FY 2017

- NWSSTG re-architected capabilities operational at dissemination IT infrastructure primary and backup site

FY 2018 - 2020

- Steady-State

Deliverables:

- Completed dissemination IT infrastructure for dissemination services at primary and backup sites
- Completed initial NWSSTG re-architected capabilities at dissemination IT infrastructure primary site
- Completed capabilities to support continuation of full porting and testing of NWSSTG re-architected capabilities onto dissemination IT infrastructure
- Full operational capabilities for NWSSTG re-architected capabilities by FY 2017 to include NWSSTG 100 percent backup capabilities

Performance Goals and Measurement Data:

Performance Measure:	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
System Availability (%)							
With Decrease	N/A	N/A	98.0%	99.0%	99.9%	99.9%	99.9%
Without Decrease	100%	98.0%	98.0%	99.0%	99.9%	99.9%	99.9%
Description: This metric is a measure of the effectiveness and robustness of the system including NWS websites and dissemination running on non-operational platforms. It measures the amount of time the system is on-line and available to support the primary mission.							

Performance Measure: Operational Backup Capability	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Decrease	N/A	N/A	90%	100%	100%	100%	100%
Without Decrease	76%	80%	90%	100%	100%	100%	100%
Description: This metric is the percentage of operational capability supported by the backup system including NWS websites and dissemination running on non-operational platforms. The completion of the Technology Re-alignment in early FY 2014 increases the backup capabilities targets with the end goal of implementing 100 percent operational backup capability by the end of FY 2017 via the Dissemination Re-architecture project. The purpose of ensuring all functions are successfully implemented via the backup system at 100% level by 2017 to limit mission interruption and mission degradation to ensure NWS can meet its mission providing timely forecast, watches, and warnings to its customers.							

Out year Funding Estimates (\$ in thousands):

Dissemination	FY 2015 & Prior	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	CTC	Total
Change from FY 2016 Base		(10,416)	(18,020)	(18,020)	(18,020)	(18,020)	N/A	
Total Request	104,353	45,684	35,335	24,919	24,919	24,919	N/A	Recurring

Out years are estimates only. Future requests will be determined through the annual budget process.

*Includes Disaster Relief Appropriations Act, 2013.

**FY 2015 & Prior is back to FY 2013

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: National Weather Service
Sub-program: Systems Acquisition
Program Change: Re-architected NWS Telecommunications Gateway

Object Class		FY 2016 Decrease	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$0
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.6	Leave Surcharge Full-Time	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	<u>0</u>	<u>0</u>
12	Civilian personnel benefits	0	0
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	73
22	Transportation of things	0	13
23.1	Rental payments to GSA	0	9
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and misc charges	0	3,779
24	Printing and reproduction	0	0
25.1	Advisory and assistance services	(10,416)	15,950
25.2	Other services	0	4,767
25.3	Purchases of goods & services from Gov't accounts	0	326
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	1,780
31	Equipment	0	7,887
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	0
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	0	0
44	Refunds	0	0
99	Total obligations	<u>(10,416)</u>	<u>34,584</u>

Due to financial system limitations, the object class detail for the Program reflects the Dissemination PPA.

**APPROPRIATION ACCOUNT: PROCUREMENT, ACQUISITION, AND CONSTRUCTION
SUB-PROGRAM: NWS CONSTRUCTION**

The objective of the Construction sub-program is to:

- Construct and provide for major repairs to Forecast Offices and other government owned weather facilities

FACILITIES CONSTRUCTION & MAJOR REPAIRS

To support its mission, the NWS operates and maintains 122 WFOs, 13 RFCs, 18 WSOs, 9 National Centers; 2 Data Collection Offices, and 2 Tsunami Warning Centers. Of the WFOs and WFO/RFCs, 35 are leased. To support these facilities, the Facilities Construction & Major Repairs PPA account is managed by NWS Headquarters in a matrixed approach.

The objectives of the Facilities Construction & Major Repairs sub-program are to:

- Upgrade and improve NOAA's Forecast Offices;
- Maintain structural integrity through capital improvements ; and
- Maintain compliance with Federal law and national and local building codes.

This program, formerly known as WFO Construction, started in the late 1980s as part of the NWS modernization and restructuring program. The original scope of the project, completed in FY 1999, included the construction or lease of 117 WFOs (13 of which were co-located with RFC) at a cost of approximately \$250 million. Since then, NWS added five WFOs to address service coverage requirements in Guam; Northern Indiana; Caribou, Maine; Huntsville, Alabama; and Key West, Florida, bringing the total WFOs to 122. The original modernization scope did not include the upgrade and modernization of Alaska and Pacific Region Weather Service Offices and associated employee housing units. The original modernization facilities are reaching and exceeding twenty years in age and require typical capital improvements necessary to maintain their structural integrity, (e.g., heating, ventilating, and air conditioning systems (HVAC), roof and uninterruptible power supply replacements). In addition, this effort is essential to maintaining compliance with Federal law and national and local building codes.

The schedule, milestones, deliverables, and out-year funding estimates are provided with the program changes requested for this activity.

PROGRAM CHANGES FOR FY 2016:

Facilities Construction & Major Repairs: Weather Forecast Office and River Forecast Center Relocations and Repairs: (Base Funding: \$3,940,000 and 0 FTE; Program Change:

\$4,710,000 and 0 FTE): NOAA requests an increase of \$4,710,000 and 0 FTE for a total of \$8,650,000 and 0 FTE to continue investments that provide tenant improvements (TI) and support costs associated with WFO and RFC relocations as well as structural repairs due to unacceptable conditions at leased and owned facilities that could impact operations.

Proposed Actions:

With this increase, NWS will seek lease terms to ensure flexibility for future needs and will take advantage of opportunities for collaboration with academia, emergency management agencies and other Federal partners to advance the Weather-Ready Nation (WRN) and Research to Operations objectives.

GSA policy requires agencies to breakout mission unique requirements above the standard space with HVAC and lighting. These unique requirements are known as TIs and according to GSA policy should be funded separately from the lease. TI costs are estimated to be \$900,000 per facility and move costs are estimated to be \$600,000 per facility, yet both are determined by market conditions and facility space requirements. NWS mission unique requirements include:

- Critical circuits and communications;
- Information technology (IT) requirements to include raised flooring and additional heating, ventilating, and air conditioning systems (HVAC) for Computer Rooms;
- Tornado shelter, as required;
- Upper air inflatable shelter, as required;
- Security equipment and access control (HSPD-12); and
- Uninterruptible power supply (UPS), emergency generator, and fuel tank.

Relocating a WFO requires considerable costs and includes:

- Installation of dedicated, remote communications to existing Next Generation Weather Radar (NEXRAD);
- Relocation of all communication circuitry;
- Relocation of entire IT suite, including the Office of Operational System Network (OPSnet), Advanced Weather Interactive Processing System (AWIPS) and Upper Air systems;
- Parallel operation of dual AWIPS equipment during transition; and
- Relocation of office furniture and fixtures.

Investment in WFOs and WFO/RFCs relocations or repairs mitigates operational risks as these improvements are needed for the continuity of weather forecast and warning operations and compliance with weather office standards. Standards of structural integrity, maintenance, security, temperature control, and adequate utilities ensure forecasters, and the computing and system resources they rely on, meet regulations for issuing timely and accurate weather forecasts and warnings. Further, many of these WFOs are located in severe weather areas, where tornados and hurricanes occur and where citizens, emergency managers, and local officials count on the timely and accurate delivery of weather warnings.

Statement of Need and Economic Benefits:

To support its mission, the NWS operates a number of unique facilities including 122 WFO and 13 RFCs. Of this total, 35 WFOs and WFO/RFCs have been leased since the 1990s. Today, several of these facilities face challenges that jeopardize continued operations.

Since the inception of these leases twenty or more years ago, major system components have failed and comprehensive system failure threatens to compromise mission readiness. The demands of 24/7 operations accelerate deterioration of facility components and systems. Facility life-safety components, such as door closers leading into egress stairwells and panic hardware, are either missing or inoperable at some locations, while other locations have non-compliant fire suppression systems. Loss of these facilities will adversely impact service delivery, jeopardizing life and property. Without additional funding, NOAA will be required to revert to short-term, limited competition leases, which could take resources and focus away from our WRN activities.

Resource Assessment:

The current resources for this activity are described in the Facilities Construction & Major Repairs narrative, and are used to upgrade and maintain NOAA facilities. Additional resources are needed for relocation of WFOs and WFO/RFCs.

Schedule and Milestones:

FY 2016

- Relocate WFOs and WFO/RFCs

Deliverables:

- WFOs and WFO/RFCs with TI under new leases or moved to vacant federally owned space

Out year Funding Estimates (\$ in thousands):

Facilities Construction & Major Repairs	FY 2015 & Prior	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	CTC	Total
Change from FY 2016 Base		4,710	(781)	(781)	(781)	(781)	0	
Total Request	22,925	8,650	3,159	3,159	3,159	3,159	N/A	Recurring

Out years are estimates only. Future requests will be determined through the annual budget process.

*FY 2015 & Prior is back to FY 2013

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: National Weather Service
Sub-program: Construction
Program Change: Weather Forecast Office and River Forecast Center Relocations and Repairs

Object Class		FY 2016 Increase	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$0
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.6	Leave Surcharge Full-Time	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	<hr/> 0	<hr/> 0
12	Civilian personnel benefits	0	0
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	42
22	Transportation of things	0	0
23.1	Rental payments to GSA	0	0
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and misc charges	0	0
24	Printing and reproduction	0	0
25.1	Advisory and assistance services	2,510	5,410
25.2	Other services	0	350
25.3	Purchases of goods & services from Gov't accounts	0	6,100
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	107
31	Equipment	0	0
32	Lands and structures	2,200	4,700
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	0
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	1
44	Refunds	0	0
99	Total obligations	0	0
44	Refunds	0	0
99	Total obligations	<hr/> 4,710	<hr/> 16,710

Due to financial system limitations, the object class detail for the Program reflects the Facilities Construction and Major Repairs PPA

Facilities Construction & Major Repairs: Completion of the National Reconditioning Center/National Logistics Supply Center Relocation: (Base Funding: \$8,060,000 and 0 FTE; Program Change: -\$8,060,000 and 0 FTE): NOAA requests a decrease of \$8,060,000 and 0 FTE for a total of \$0 and 0 FTE for the planned completion of the NRC/NLSC relocation in Kansas City, Missouri.

Proposed Actions:

In FY 2015, NOAA requested funds for the one-time relocation of the NRC/NLSC because the GSA will close its Bannister Federal Complex location in order to reduce the overall Federal Real Property Portfolio. Accordingly, GSA required that the NWS' NRC/NLSC vacate the property by December 31, 2015. NOAA and GSA have a signed occupancy agreement at a new site in Kansas City, MO requiring no staff moves.

Resource Assessment:

There are no further requirements for this funding.

Schedule and Milestones:

FY 2016

- Steady state operations of relocated NRC/NLSC

Deliverables:

- N/A

Out year Funding Estimates (\$ in thousands):

Facilities Construction & Major Repairs	FY 2015 & Prior	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	CTC	Total
Change from FY 2016 Base		(8,060)	(8,060)	(8,060)	(8,060)	(8,060)	0	
Total Request	22,925	8,650	3,159	3,159	3,159	3,159	N/A	Recurring

Out years are estimates only. Future requests will be determined through the annual budget process.

*FY 2015 & Prior is back to FY 2013

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: National Weather Service
Sub-program: Construction
Program Change: Completion of the National Reconditioning Center/National Logistics Supply Center Relocation

Object Class		FY 2016 Decrease	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$0
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.6	Leave Surcharge Full-Time	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	<hr/> 0	<hr/> 0
12	Civilian personnel benefits	0	0
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	42
22	Transportation of things	0	0
23.1	Rental payments to GSA	0	0
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and misc charges	0	0
24	Printing and reproduction	0	0
25.1	Advisory and assistance services	(1,709)	1,191
25.2	Other services	0	350
25.3	Purchases of goods & services from Gov't accounts	(4,351)	1,749
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	107
31	Equipment	0	0
32	Lands and structures	(2,000)	500
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	0
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	1
44	Refunds	0	0
99	Total obligations	0	0
44	Refunds	0	0
99	Total obligations	<hr/> (8,060)	<hr/> 3,940

Due to financial system limitations, the object class detail for the Program reflects the Facilities Construction and Major Repairs PPA

BUDGET PROGRAM: NATIONAL ENVIRONMENTAL SATELLITE, DATA, AND INFORMATION SERVICE

For FY 2016, NOAA requests a total of \$2,379,627,000 and 885 FTE for the National Environmental Satellite, Data and Information Service (NESDIS). This funding includes a net increase of \$154,838,000 and 6 FTE in program changes.

NESDIS OVERVIEW

NESDIS is responsible for the procurement, launch, and operation of the Nation's civil operational environmental satellites, which are central to providing the Nation with intelligence data for predictive environmental and atmospheric modeling systems as well as forecasts and warnings based on this data. Along with providing for the health, safety, and management of the satellites, NESDIS manages the product development and distribution of the corresponding data. NOAA satellites support advancement of the forecast enterprise by improving the resolution of data for better models to be used in making decisions that can affect lives, property, and segments of the economy for years. While providing real-time operations and data services, NESDIS also works toward developing the next generation of satellites in order to continue meeting its primary mission essential functions without incurring gaps in coverage.

As authorized in the Consolidated and Further Appropriations Act, 2015, NOAA restructured NESDIS Operations, Research, and Facilities (ORF) and Procurement, Acquisition, and Construction (PAC) account Programs, Projects, and Activities (PPA). This restructure is aimed at increasing flexibility and efficiency to continue to meet the operational needs of current and future missions.

The NESDIS ORF account is organized into two sub-programs: (1) Environmental Satellite Observing Systems, with \$125,915,000 and 335 FTE and (2) National Centers for Environmental Information, with \$58,180,000 and 242 FTE.

The Environmental Satellite Observing Systems sub-program: (1) provides secure and efficient command and control of NOAA, Department of Defense (DOD), and other non-NOAA operational environmental satellites; and (2) ensures secure, timely, and uninterrupted delivery of data to users, including product processing, development, and distribution.

The Environmental Satellite Observing Systems sub-program includes the following budget Line Items and PPAs for FY 2016:

- Satellite and Product Operations;
- NOAA Satellite Operations Facility (NSOF) Operations;
- Product Development, Readiness, and Application (PDR&A);
- Commercial Remote Sensing Regulatory Affairs (CRSRA);
- Office of Space Commercialization (OSC); and
- Group on Earth Observations (GEO).

The National Centers for Environmental Information (NCEI) sub-program continues the functions of the National Climatic Data Center, National Geophysical Data Center, and National Oceanographic Data Center by: (1) providing the Nation with the long-term archive of and access to past, present, and future environmental observations and associated data recorded across the U.S. and globally; and (2) providing worldwide environmental data and information products and services in the atmospheric, oceanographic, marine, solid Earth, and solar-terrestrial sciences to meet the needs of users.

The National Centers for Environmental Information sub-program includes the National Centers for Environmental Information budget Line Item and PPA for FY 2016.

The NESDIS PAC account is organized into two sub-programs: (1) Systems Acquisition and (2) Construction.

The Systems Acquisition program maintains structured satellite acquisitions to prevent gaps in data coverage to preserve long-term satellite data continuity.

The Systems Acquisition sub-program (\$2,039,830,000 and 302 FTE) includes the PPAs below:

- Geostationary Systems – R Series;
- Altimetry Mission – Jason-3;
- Polar Orbiting Systems – Joint Polar Satellite System (JPSS)
- Solar Irradiance Data and Rescue (SIDAR);
- Deep Space Climate Observatory (DSCOVR);
- COSMIC-2/Global Navigation Satellite System Radio Occultation (GNSS RO);
- Satellite Ground Services (SGS);
- Systems Architecture and Advanced Planning (SAAP); and
- Projects, Planning and Analysis (PPA).

The Construction sub-program supports the operation and critical infrastructure at satellite command and data acquisition facilities.

The Construction sub-program includes the Satellite Command and Data Acquisition (CDA) Facility PPA (\$2,166,000 and 0 FTE).

Research and Development (R&D) Investments:

The NOAA FY 2016 Budget estimates for R&D investments are the result of an integrated requirements-based strategic planning process. This process provides the structure to link NOAA's strategic vision with programmatic detail and budget development, with the goal of maximizing resources while optimizing capabilities. NESDIS requests \$25,876,000 for investments in R&D in the FY 2016 budget.

The NOAA Research Council—an internal body composed of senior scientific personnel from every Line Office in the agency—developed NOAA's most recent Five-Year Research and Development Plan (FY 2013–2017). This plan will guide NOAA's R&D activities through FY 2017. The plan guides NOAA R&D and provides a common understanding among NOAA's leadership, its workforce, its partners, constituents and Congress on the value of NOAA's R&D activities.

Significant Inflationary Adjustments:

NOAA's FY 2016 Budget includes a total of \$3,445,000 and 0 FTE to account for the full funding requirement for inflationary adjustments to current programs for NESDIS activities. This includes the estimated 2016 Federal pay raise of 1.3 percent as well as inflationary increases for non-labor activities, including service contracts, utilities, field office lease payments, and rent charges from the General Services Administration (GSA).

Technical Adjustments:

Consistent within the authorized NESDIS restructuring, the technical adjustment transfers a total of \$6,150,000 and 0 FTE from the ORF account to the PAC account for a net change of \$0 and 0 FTE to the agency. This funding transfer supports the NESDIS restructure proposed in FY 2015 to better coordinate systems engineering, plan for more robust systems architecture and examine more cost effective means of providing its products and services by standardizing product distribution, access, and archiving.

NOAA also requests to change the name of the National Environmental Information Office (NEIO) to the National Centers for Environmental Information (NCEI).

In addition, NOAA requests a technical adjustment to transfer a total of \$5,500,000 and 2 FTE from the National Centers for Environmental Information PPA (formerly National Environmental Information Office) to the Satellite and Product Operations PPA for a net change of \$0 and 0 FTE to the agency. This transfer will enable synergies and efficiencies related to the operations and maintenance functions of information technology which are consistent with the new NESDIS organizational functions.

NOAA also requests a transfer of \$1,800,000 and 7 FTE to move the NOAA Central Library, as well as two regional libraries (Miami and Seattle), from NESDIS to OAR. This transfer will shift the management of the Central Library to the largest user in NOAA. It will allow the Central Library to continue to provide useful corporate services, and the regional libraries to streamline operations by co-locating management with the facility and customers it serves.

From Office	PPA	To Office	PPA	Amount/FTE
NESDIS	National Centers for Environmental Information	NESDIS	Satellite Ground Services	\$3,785,000/ 0 FTE
NESDIS	Product Development Readiness and Application	NESDIS	System Architecture and Advanced Planning	\$124,000/ 0 FTE
NESDIS	Satellite and Product Operations	NESDIS	Satellite Ground Services	\$2,023,000/ 0 FTE
NESDIS	Satellite and Product Operations	NESDIS	System Architecture and Advanced Planning	\$218,000/ 0 FTE
NESDIS	National Centers for Environmental Information	NESDIS	Satellite and Product Operations	\$5,500,000/ 2 FTE
NESDIS	National Centers for Environmental Information	OAR	Ocean, Coastal, and Great Lakes Research Laboratories and Cooperative Institutes	\$1,800,000/ 7 FTE

Headquarters Administrative Costs:

In FY 2016, NESDIS Line Office headquarters will use \$27,916,000 to support general management activities, financial and budgeting, and IT related expenses, as well as supporting facilities and other general operating costs. These funds also include support for service contracts, utilities, and rent charges from the General Services Administration. Specifically, NESDIS will use headquarters administrative funds to support the following:

Headquarters Program Support Type	Description	FY 2016 Amount	FY 2016 FTE associated with NESDIS Line Office HQ
General Management & Direction/Executive Management	Includes Assistant Administrator's office, public affairs, information services	9,282,500	37
Budget & Finance	Includes Budget, Finance and Accounting	3,456,700	18
Facilities/Other Administrative (CAO Functions)	Includes Facilities and Security costs, as well as other CAO related activities	3,203,300	8
Human Resources	All HR services, including Equal Employment Opportunity	1,417,900	8
Acquisitions and Grants	Contracts, grants and procurement implementation	321,900	2
Information Technology	Includes IT-related expenses and other CIO related activities	10,233,700	24
Total		27,916,000	97

Narrative Information:

Following this section are resource justification materials and program change narratives by sub-program for this line office. Please note that no program change narrative is provided for program changes of less than \$100,000, however, a summary exhibit is provided at the end of each sub-program showing the object class detail for the small program changes. Please contact the Department of Commerce if details for any of these changes are required.

APPROPRIATION ACCOUNT: OPERATIONS, RESEARCH, AND FACILITIES
SUB-PROGRAM: ENVIRONMENTAL SATELLITE OBSERVING SYSTEMS

Billions of dollars in damage are incurred each year due to natural disasters and extreme weather events including catastrophic tornadoes, destructive hurricanes, and devastating drought conditions. NOAA meets the Nation's requirement to provide environmental satellites and related ground systems capable of providing timely and accurate environmental data for use in forecasts, warnings, and expertise essential to public safety and preparedness, the national transportation system, and the protection of the Nation's critical infrastructure and natural resources. Losses from these events would be significantly worse if NOAA satellite data and services were unavailable due to interference with, or the failure of, critical satellite command and data acquisition infrastructure provided by NOAA's Environmental Satellite Observing Systems.

The goals of NOAA's Environmental Satellite Observing Systems include: (1) maintaining and operating a system of polar-orbiting satellites to obtain global environmental data, to increase the timeliness and accuracy of mid-range weather forecasts, and to provide operational forecasts for Alaska; (2) maintaining and operating a system of geostationary satellites to provide near-continuous environmental observations of the Earth's Western Hemisphere critical for weather forecasting and severe storm tracking; (3) acquiring, processing, and analyzing data from NOAA, the Department of Defense (DOD), and other Earth-observing satellites; (4) supplying data and interpretations to users including operational products used in decision-making; (5) introducing new technology and processes to improve environmental satellite system capabilities; (6) determining requirements for future satellite systems; (7) serving as the lead U.S. agency for the Search and Rescue satellite system, including operating and maintaining the mission control center; (8) monitoring global sea ice conditions to support safe and effective marine transportation; and (9) demonstrating better ways to use and distribute environmental data from NOAA, the National Aeronautic and Space Administration (NASA), and other satellites, aircraft, and laboratory sources.

Included in this sub-program are the Satellite and Product Operations, NSOF Operations, , Product Development, Readiness, and Application (PDR&A), Commercial Remote Sensing Regulatory Affairs (CRSRA), Office of Space Commercialization (OSC), and the Group on Earth Observations (GEO) PPAs. Together, these offices and programs operate to meet the diverse set of goals listed above in order to maintain satellite command and control, develop satellite products, enforce interagency compliance, develop commercial space policy, and support international agreements. The FY 2016 request supports the continued maintenance of such operations outlined below.

OFFICE OF SATELLITE AND PRODUCT OPERATIONS (<http://www.ospo.noaa.gov/>)

The Office of Satellite and Product Operations (OSPO) budget Line Item includes various functions related to the real-time operation of NOAA's observational environmental satellites and associated services.

Primarily, OSPO manages and directs NOAA's efficient and secure command and control of NOAA's on-orbit satellites including three Geostationary Operational Environmental Satellites (GOES), five polar-orbiting satellites, including Polar-orbiting Operational Environmental Satellites (POES) and Suomi National Polar-orbiting Partnership (Suomi NPP), seven DOD's Defense Meteorological Satellite Program (DMSP), and other non-NOAA operational environmental satellites to ensure timely and uninterrupted delivery of data to users and in support of specific NOAA missions. OSPO supports operation of the NOAA Satellite Operations Facility (NSOF), a state-of-the art facility and infrastructure that houses high-technology equipment, including 16 antennae. Through NSOF,

NOAA operates the ground systems that command, control, and acquire data from NOAA's on-orbit satellites 24 hours per day, 365 days per year. OSPO's role in satellite operations is to monitor satellite health and safety, schedule satellite operations and data acquisition to meet user needs, evaluate satellite systems performance, support NASA during launch, activation, and evaluation of new satellites, assess satellite and ground station anomalies, and support appropriate recovery actions for those anomalies.

In addition to satellite operations, the around-the-clock critical operations at NSOF provide environmental data used to develop weather and climate products used daily by industry and citizens across the Nation. OSPO works with NOAA's National Weather Service (NWS) and supplies the satellite data that makes up approximately 93 percent of the information used in numerical weather prediction models. OSPO provides approximately 450 operational products organized into three categories: atmospheric, oceanographic, and terrestrial.

OSPO includes the Satellite Operations Control Center (SOCC)/Command and Data Acquisition (CDA) Facilities, which provide the vital link between satellites and users. SOCC/CDA operations provide uninterrupted availability of critical observations that support NOAA's mission-essential functions and provide real-time delivery of satellite data to product processing centers that, in turn, support NOAA's NWS mission to protect lives and property during severe weather events.

OSPO manages NOAA's Search and Rescue Satellite Aided Tracking (SARSAT) system and coordinates participation in the International COSPAS-SARSAT Program. SARSAT has contributed to the rescue of more than 35,000 people worldwide, including more than 7,400 people in the U.S., since its inception in 1982.

OSPO also manages NOAA's contribution to the U.S. National Ice Center (NIC) and hosts the NIC in NOAA's Suitland, Maryland, facility. The NIC is jointly-operated by the U.S. Navy and the U.S. Coast Guard, which monitors global sea ice conditions in the Polar Regions, Great Lakes, and Arctic and North Atlantic waters to support safe and effective transportation for the civil and military maritime communities.

OSPO supports the Comprehensive Large Array data Stewardship System (CLASS) Operations Systems (Data Center Operations). CLASS will soon reach full operational capability, replacing the current legacy archive systems and equipping the National Centers for Environmental Information with the needed scalability and reliability to support long-term preservation of and access to the ever-increasing input of data from our observing systems (e.g., satellites, radar, and other ground observations).

Schedule and Milestones:

Office of Satellite and Product Operations

FY 2016–FY 2020:

- Maintain Satellite Operation Facilities at Suitland, MD; Wallops, Virginia; and Fairbanks, Alaska
- Conduct annual penetration testing on all IT systems
- Continuous Monitoring of all IT Systems
- Assessment and Authorization for required IT Systems
- Process and distribute environmental data from Suomi National Polar-orbiting Partnership (Suomi NPP) data, legacy GOES, POES, METOP A, B

FY 2016:

- Command and Control 9 NOAA Satellites and support 11 non-NOAA Satellites
- Distribute validated GOES-R products, SNPP data, legacy GOES, POES, METOP A, B

FY 2017:

- Command and Control 9 NOAA Satellites and support 11 non-NOAA Satellites
- Process and distribute Suomi NPP products;
- Bring GOES-16 (GOES-R) and Metop-C into operation

FY 2018:

- Command and Control 9 NOAA Satellites and support 10 non-NOAA Satellites
- Process and distribute new JPSS products to users within 98.5% of targeted time
- Distribute validated GOES-R products, SNPP data, legacy GOES, METOP A, B

FY 2019:

- Command and Control 10 NOAA Satellites and support 10 non-NOAA Satellites
- Process and distribute new JPSS products to users within 98.5% of targeted time
- Distribute validated GOES-R products, SNPP data, legacy GOES, METOP A, B

FY 2020:

- Command and Control 10 NOAA Satellites and support 10 non-NOAA Satellites
- Process and distribute new JPSS products to users within 98.5% of targeted time
- Distribute validated GOES-R products, SNPP data, legacy GOES, METOP A, B

Deliverables:

Office of Satellite and Product Operations

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
Infrastructure Maintained # of National/Mission High and Moderate Critical Systems	10	10	11	11	11

- Delivery of Suomi NPP data to users
- New products transitioned into operations
- Upgraded system architecture to meet security needs and to facilitate transition of research products into operations

Performance Goals and Measurement Data:

Office of Satellite and Product Operations

Performance Measure:	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
Percentage of NOAA-managed satellite data processed and distributed within targeted time	99.7%	98.5%	98.5%	98.5%	98.5%	98.5%	98.5%

Description: This measure includes data from NOAA's GOES and POES satellites. It tracks the processing and distribution of environmental data to the users. This measure is used to track timeliness and customer satisfaction. The targeted time varies per satellite: GOES is 15 minutes, POES is 180 minutes (which is based on Advanced Television Infra-Red Observation Satellite Operational Vertical Sounder timeliness).

Performance Measure: Percent of Suomi NPP satellite data ingested, processed, and distributed within targeted time	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	99.6%	95%	95%	95%	95%	95%	95%
Description: The goal is to reach 95 percent of all available Suomi NPP data processed by the Suomi NPP Production Environment within 180 minutes from the time of observation.							

Performance Measure: Percentage of ice and snow products produced and delivered within targeted time	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	99.4%	99%	99%	99%	99%	99%	99%
Description: Percentage of imagery required daily by the National Ice Center (NIC) to generate weekly critical ice forecast and other ice products needed for safe marine transportation.							

Performance Measure: Transmission percentage rate of SARSAT distress alert and location information to search and rescue authorities within targeted time	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	95.8%	95%	95%	95%	95%	95%	95%
Description: Performance measure is important to beacon user customer group. The ability to deliver distress alerts in a timely fashion directly affects the chances of survival for the individual(s) in distress. Baseline performance was derived from historical data. The target performance is included in the Interagency SARSAT Operational Requirements document.							

Performance Measure: Percent of System Availability, "Up Time" for data archive and access	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	99%	99%	99%	99%	99%	99%	99%
Description: Each CLASS node operates 24 hours a day, seven days a week. The cumulative up-time for all nodes is targeted at 99%.							

PRODUCT DEVELOPMENT, READINESS & APPLICATION
(<http://www.star.nesdis.noaa.gov/star/index.php>)

NOAA's Product Development, Readiness, and Application (PDR&A) budget Line Item and PPA provides applications-focused research that will develop and evaluate prototype products, algorithms, and pre-operational products to improve existing operational satellite products and services using data from current and next-generation environmental satellites.

PDR&A enhances the accuracy of current satellite products and develops new satellite products to meet user requirements. Activities range from planning new satellite instruments to developing new satellite products and applications. This includes transitioning new satellite products to operations, improving satellite products as instruments degrade, and performing calibration/validation activities between instruments. The PDR&A activities ensure the highest accuracy of NOAA's current operational environmental satellite data and products via a robust and rigorous satellite data calibration/validation program. PDR&A also increases forecast

prediction capabilities using advanced satellite assimilation methods. Improved prediction capabilities lead to more accurate forecasts and better decision-making.

The program is also a risk reduction measure designed to accelerate the JPSS and GOES-R data utilization for the development of numerical weather prediction models and forecast models that will lead to increased accuracy and longer-range forecasts. In the next few years, the number and quality of satellite instruments will grow significantly following launches of next-generation satellites, providing an exponential increase in higher quality data capable of allowing major improvements in the accuracy of weather prediction, making FY 2016 development activities critical.

Schedule and Milestones: (Based on current launch schedules and data availability)

PDR&A

- FY 2016: Post-launch checkout of GOES-R and Jason-3
- FY 2017: Post-launch checkout of JPSS-1, METOP-C and Sentinel-3
- FY 2018: Post-launch checkout of GOES-S and GCOM
- FY 2019: Post-launch checkout of GOES-T and GCOM
- FY 2020: Pre-Launch Checkout for JPSS-2

Deliverables: (Per the above schedule)

PDR&A

- FY 2016: GOES-R and Jason-3 Instrument and / or Product Quality Assessment
- FY 2017: JPSS-1 / METOP-C / Sentinel-3 Instrument and / or Product Quality Assessment
- FY 2018: GOES-S and GCOM Instrument and / or Product Quality Assessment
- FY 2019: GOES-T and GCOM Instrument and / or Product Quality Assessment
- FY 2020: JPSS-2 Instrument and / or Product Quality Assessment

Performance Goals and Measurement Data:

PDR&A

Performance Measure:	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
	Actual	Target	Target	Target	Target	Target	Target
Number of products, applications, techniques, systems developed and/or transitioned to operations	16	13	14	14	14	14	14
Description: As new requirements for satellite data and environmental information are identified and understood, research is performed that leads to the creation of new information products, applications, processing techniques, and systems. To apply the research to operational needs, satellite information products are developed and tested that meet the requirements of customers (e.g., National Weather Service). After an extensive evaluation, the products that satisfy the requirements are transferred to operations for customer use.							

Performance Measure: Number of sensors/instruments evaluated for quality and performance	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	31	31	31	31	31	31	31

Description: Advanced satellite instruments on board GOES-R, JPSS, and METOP satellites are fully assessed and characterized. Sensor quality on current NOAA and METOP satellites are updated to meet the requirements of customers (e.g., National Weather Service) for use in numerical weather prediction and other environmental applications. Number of sensors/estimates may fluctuate with the launch of new satellites.

Performance Measure: Number of refereed papers published	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	138	90	90	90	90	90	90

Description: To assure that research is valid, high-quality, and up-to-date, scientific results are published in peer-reviewed journals.

COMMERCIAL REMOTE SENSING REGULATORY AFFAIRS (CRSRA)
(<http://www.nesdis.noaa.gov/CRSRA/>)

The Nation requires a consistent and transparent regulatory process for licensing private remote sensing space systems in order to promote U.S. technological competitiveness and economic security, while ensuring satellite operation is consistent with our national security, intelligence, and foreign policy needs. The CRSRA program supports these requirements while furthering the Nation’s homeland security and national security missions.

DOC’s CRSRA program, managed by NOAA, is responsible for enforcement and ensuring compliance with the terms of the license agreements as well as coordinating interagency review of satellite license applications, amendments, and foreign agreements. Worldwide commercial remote sensing space data sales were estimated to be \$735 million in 2007 and are expected to increase to \$2.5–\$3.4 billion by 2017. The CRSRA program coordinates interagency review of satellite license applications, amendments, and foreign agreements.

Schedule and Milestones:

CRSRA

FY 2016-2020: Review regulations for currency and update if appropriate, and republish any new regulations

Deliverables:

CRSRA

- Issuance of new licenses, waivers, and/or amendments to licenses
- Review and approval of foreign agreements
- Quarterly and annual audits
- Annual inspections with appropriate documentation for the record

Performance Goals and Measurement Data:

CRSRA

Performance Measure:	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
Process all regulatory actions within statutory time lines and conduct all required audits and inspections of domestic and foreign ground stations	63 audits and inspections. Process 17 new licenses.	54 audits and inspections. Process at least 6 new licenses.	65 audits and inspections. Process at least 6 new licenses.	75+ audits and inspections. Process at least 6 new licenses.	75+ audits and inspections. Process at least 6 new licenses.	75+ audits and inspections. Process at least 6 new licenses.	75+ audits and inspections. Process at least 6 new licenses.

Description: Regulatory actions include the submission of new licenses, the amendment of an existing license (both are 120 days by law), review, and approval of any waiver to a license or a foreign agreement (60 days). Audits and inspections are the quarterly and annual review of records, licenses, data protection plans and agreements, and the annual onsite inspection of the company and any domestic or foreign ground station associated with the collection of satellite data. It is the verification for enforcement.

OFFICE OF SPACE COMMERCIALIZATION (OSC)

(<http://www.space.commerce.gov>):

OSC, managed by NOAA for DOC, is responsible for developing space-related policies and the promotion of the capabilities of the U.S. commercial space industry. OSC represents DOC in negotiations with foreign countries to ensure free and fair trade internationally in the areas of space commerce, assists U.S. commercial providers in their efforts to expand their business with the U.S. Government, and promotes commercial provider investment by performing economic analysis on space and space-related markets.

Schedule and Milestones:

OSC

FY 2016-2020:

- Accomplish two major policy decisions and commercial industry activities per quarter
- Conduct an annual NOAA space commercialization workshop with industrial and international participation

Deliverables:

OSC

- Increased opportunities for commercial solutions for key NOAA and other civil government data acquisition requirements
- Improved coordination between government and industry on space-related issues and enhanced engagement in interagency space-related policy activities

Performance Goals and Measurement Data:OSC

Performance Measure:	FY						
Number of major policy decisions supported and industry studies (and related activities) executed	2014	2015	2016	2017	2018	2019	2020
	Actual	Target	Target	Target	Target	Target	Target
	10	8	8	8	8	8	8
Description: The target represents specific actions planned to be executed during the year that deal with commercial space issues and industry studies of the market.							

GROUP ON EARTH OBSERVATIONS (GEO)**(<http://www.noaa.gov/eos.html>):**

GEO, an intergovernmental body, is a voluntary international partnership of governments and international organizations that provides a framework where partners can collaborate globally on Earth observations. Its mission is the implementation of a Global Earth Observation System of Systems (GEOSS). GEOSS represents a commitment to three important Administration principles: (1) science-based decision making, (2) open access to data and information, and (3) increased international cooperation on the application of science and technology in the field of Earth observations.

Program resources support the activities of the GEO Secretariat staff in Geneva, who coordinate the implementation of the GEO Work Plan. Tasks range from data integration and management, to water cycle observations, to Earth observations for climate change adaptation. Program resources also support the domestic cooperative activities of USGEO, which include: preparations for U.S. Government participation in major GEO meetings and events; coordination, planning, and assessment of Federal Earth observation activities; fostering of improved data management and interoperability; and the planning and coordination of meetings focused on Federal agency investments in Earth observations, workshops, and other forums. In addition to the funding provided in the GEO PPA, NESDIS Headquarters funds labor/benefits, travel, and supplements the USGEO grant.

Schedule and Milestones:GEO

FY 2016-2020: Support annual meeting of member governments and participating international organizations at GEO Plenary and associated Executive Committee and related meetings

FY 2016: Support drafting and issuance of new GEO ten year implementation plan

Deliverables:GEO

- Support the development of U.S. positions and contributions to the GEOSS Implementation Plan through participation in major GEO meetings and events
- Development of reports for the Executive Office of the President as requested
- Planning and coordination meetings focused on Federal agency investments in Earth observations, workshops, and other forums

Performance Goals and Measurement Data:

GEO

Performance Measure	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
Measure 1: Number of grants provided in support of annual USG participation in the implementation of GEOSS	1	1	1	1	1	1	1
Measure 2: Number of contracts and MOUs provided in support of national Earth observation portfolio	1	2	2	2	2	2	2
Description: Provide support for annual participation in the implementation of GEOSS and coordination of national Earth observation portfolio by USGEO, a NSTC Subcommittee, by providing a grant to GEO Secretariat and funds for USGEO Secretariat and Program Office through Interagency Agreements.							

PROGRAM CHANGES FOR FY 2016:

Satellite and Product Operations: Data Center Operations (DCO): Base Funding: \$5,500,000 and 2 FTE; Program Change: +\$4,582,000 and 0 FTE: NOAA requests an increase of \$4,582,000 and 0 FTE for a total of \$10,082,000 and 2 FTE to operate and maintain the Comprehensive Large Array-Data Stewardship System (CLASS).

Proposed Actions:

This initiative requests funds to transition the CLASS system from a test and development environment to full operations. CLASS provides NOAA with required long-term safe archival storage capacity and provides the general public with access to the preserved climatological, oceanographic, and geophysical data. The FY 2016 request is necessary to provide the operations and maintenance (O&M) for the core capabilities of CLASS, including

- Maintenance support for the operational software and hardware;
- Meeting all security requirements;
- Technical training to keep operators' skill levels current; and
- Data analytics, data compression, data translation, and reprocessing of archival data.

Since FY 2012, the requirements of operational capabilities have significantly increased requiring a commensurate increase in ORF funding. CLASS data volumes in FY 2012 amounted to approximately 2.5 petabytes (pb), FY 2013 volumes amounted to 6 pb, and by FY 2016 volumes are expected to increase to at least 12 pb; an increase of 380% in data volumes between FY 2012 and FY 2013. CLASS begins the transition from development to Full Operational Capability (FOC) in FY 2016 and completes the transition in FY 2017. Full funding of the core operational capabilities is essential to ensure that NESDIS can expand the archive of data, supporting the increasing user demand.

Without the requested increase, NOAA will have to decommission existing operational infrastructure to meet growing O&M costs for CLASS. The backup server network at Boulder, Colorado will experience up to 18 days of contiguous down time, resulting in permanent data loss.

Statement of Need and Economic Benefits:

CLASS data and information supports strategic national, regional, and local government and business decision makers affecting investments in the billions of dollars annually. These data directly contribute to promoting a more resilient economy and healthy ecosystem. Users include, for example, municipal and rural water managers; infrastructure and urban planners; agriculture, livestock, and commercial nursery owners; insurance providers; energy companies; entrepreneurs and investors; research scientists and academic institutions; and public health officials.

CLASS preserves and provides access to rapidly increasing data volumes from the Nation's multi-billion dollar investment in the JPSS and GOES-R programs, as well as observations from other satellite and radar systems; surface, upper atmosphere, ocean, and space weather observing networks; weather and climate model outputs; and derived products and information. All NOAA observing and modeling programs are to provide funding for initial and sustaining archive requirements throughout the duration of the program. CLASS core capabilities must be maintained on an ongoing basis to preserve data beyond the life of the observing and modeling programs.

Resource Assessment:

Current Data Center Operations funding is not sufficient to cover CLASS O&M costs as the system transitions to full operations. CLASS Development, Testing, and Integration began the transition to Initial Operational Capability (IOC) in FY 2012 to coincide with the Suomi NPP launch. Since FY 2012, CLASS has been operating in a test environment during which the level of operational capabilities has steadily increased. In FY 2016, CLASS will begin the transition to FOC, at which point full funding for the core capabilities is required. Funding for sustainment costs are covered within the PAC account.

Schedule and Milestones:

FY 2016-2020:

- Safe storage and access for historical data emigrated from legacy systems to new system
- Operate and sustain CLASS with minimum system availability of 95% for each node (Climatic and Geophysical) and overall 99% up time

FY 2016:

- Operate, sustain, and refresh current operational capability and new generation NOAA CLASS
- Begin transition to FOC
- Data Centers accept delivery of CLASS for operations and maintenance
- Additional archival infrastructure to support JPSS-1 and GOES-R requirements

FY 2017:

- Accept FOC, including any final system modifications in support of JPSS-1 and GOES-R launches
- Additional archival infrastructure to support MetOp-C requirements

FY 2019:

- Additional archival and access infrastructure to support DMSP 20 requirements
- Additional archival infrastructure to support MetOp Second Generation requirements

FY 2020: Additional archival and access infrastructure to support GOES-S requirements

Deliverables:

- Continued support for the development of CLASS System. It will help centralize data management capabilities, reduce overall systems overhead, and provide additional archival storage from other NOAA line offices and programs
- Fulfillment of NOAA's Congressional mandate to preserve the Nation's Weather and Climate Data
- Support the migration of data and information from the current legacy archive systems to the new enterprise archive infrastructure
- Essential support of the environmental data needs of the Nation's public, private, and academic sectors

Performance Goals and Measurement Data:

Performance Measure: Sustained long-term preservation by safe storage and access to NOAA's data and information (Cumulative Total # Major Data Sets)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	4	7	10	14	16	18	21
Without Increase	3	4	5	6	7	9	10

Performance Measure: Number of operational archive server networks	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	2	2	2	2	2	2	2
Without Increase	1	1	1	1	1	1	1

Description: System availability with two nodes is four days of down time per year, but increases to 18 days with one server network. Downtime often occurs in contiguous blocks and data loss will occur if a long continuous block of down time occurs. For example, satellite ground systems retain, at most, the last seven days of data. Required backups with a single server network are achieved through offsite tape backups.

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: NESDIS
 Sub-program: Environmental Satellite Observing Systems
 Program Change: Data Center Operations (DCO)

Object Class		FY 2016	FY 2016
		Increase	Total Program
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$260
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	0	260
12	Civilian personnel benefits	0	78
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	0
22	Transportation of things	0	0
23.1	Rental payments to GSA	0	0
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and miscellaneous charges	300	300
24	Printing and reproduction	0	0
25.1	Advisory and assistance services	0	0
25.2	Other services	3,622	7,962
25.3	Purchases of goods & services from Gov't accounts	0	0
25.4	Operation and maintenance of facilities	0	822
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	660	660
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	0
31	Equipment	0	0
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	0
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	4,582	10,082

Commercial Remote Sensing Regulatory Affairs (CRSRA): (Base Funding: \$1,000,000 and 6 FTE; Program Change: \$200,000 and 0 FTE): NOAA requests an increase of \$200,000 and 0 FTE for a total of \$1,200,000 and 6 FTE to enforce and ensure compliance with terms of new satellite license agreements.

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: NESDIS
Sub-program: Environmental Satellite Observing Systems
Program Change: Commercial Remote Sensing Regulatory Affairs

Object Class		FY 2016 Increase	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$630
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	<hr/> 0	630
12	Civilian personnel benefits	0	193
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	69	150
22	Transportation of things	0	0
23.1	Rental payments to GSA	0	0
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and miscellaneous charges	0	12
24	Printing and reproduction	0	0
25.1	Advisory and assistance services	0	0
25.2	Other services	0	0
25.3	Purchases of goods & services from Gov't accounts	0	0
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	125	208
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	0
31	Equipment	1	2
32	Lands and structures	5	5
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	0
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	<hr/> 200	1,200

Office of Space Commercialization (OSC): (Base Funding: \$600,000 and 4 FTE; Program Change: \$400,000 and 0 FTE): NOAA requests an increase of \$400,000 and 0 FTE for a total of \$1,000,000 and 4 FTE to improve coordination between government and industry on space-related issues and increase opportunities for commercial solutions for NOAA and other civil government data acquisition requirements.

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: NESDIS
Sub-program: Environmental Satellite Observing Systems
Program Change: Office of Space Commercialization

Object Class		FY 2016 Increase	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$388
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	0	388
12	Civilian personnel benefits	0	129
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	25	25
22	Transportation of things	0	0
23.1	Rental payments to GSA	45	60
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and miscellaneous charges	0	5
24	Printing and reproduction	0	0
25.1	Advisory and assistance services	0	0
25.2	Other services	0	0
25.3	Purchases of goods & services from Gov't accounts	0	5
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	309	333
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	11	15
31	Equipment	10	40
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	0
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	400	1,000

APPROPRIATION ACCOUNT: OPERATIONS, RESEARCH, AND FACILITIES
SUB-PROGRAM: NATIONAL CENTERS FOR ENVIRONMENTAL INFORMATION

The National Centers for Environmental Information (NCEI) is the official data management entity for climatological, oceanographic, and geophysical information in the United States, with additional global environmental data management commitments defined by international agreement and scientific need. Its core responsibilities include science-based data synthesis, information services, and stewardship of its holdings, including satellite and directly-sensed climate, oceanographic, and geophysical data records and related and derived environmental information. The NCEI performs data synthesis (description, monitoring, modeling, and assessment), and data and information preservation and services (dissemination) to promote the scientific integrity and usefulness of NCEI products and services. As a part of this responsibility, the program analyzes environmental status and trends through monitoring and assessment at multiple time and space scales. Products include monthly U.S. climate reports, assessments of billion-dollar disasters, the World Ocean Atlas, and the World Magnetic Model.

The NCEI includes two functional areas for Environmental Information:

- Center for Weather and Climate, including Regional Climate Services, and
- Center for Coasts, Oceans, and Geophysics, including Regional Coastal Data Development.

The Center for Weather and Climate advances and enables weather and climate science and decision making through the acquisition, monitoring, analysis, synthesis, and delivery of observations, derived products and assessments, and information and outreach services. The Center uses data from national and international sources and operates observing systems for long-term monitoring (e.g., U.S. Climate Reference Network). It develops, describes, and helps implement operational quality control procedures and statistically analyzes observations and products to improve their value, utility, and homogeneity. The Center actively engages across NOAA and both the private and public sectors to collect and understand user needs. It develops responsive datasets, products, and services that improve environmental literacy, enable decision making, support scientific advances and assessments, and inform policymaking. It actively engages the public through regional and sectoral services as well as scientific collaborations. In addition, the Center promotes the scientific integrity and usefulness of its products and services through interactions with data providers, users, and the public.

The Center for Coasts, Oceans, and Geophysics advances and enables environmental science and related decision making through the scientific analysis, synthesis, and monitoring of oceanographic and geophysical observations, derived products and assessments, and information services in support of customer engagement. The Center develops, describes, and helps implement operational quality-control procedures and statistically analyzes observations and products to improve their value, utility, and homogeneity. The Center actively engages across NOAA and both private and public sectors to understand and capture user requirements. It develops responsive datasets, products, and services that improve environmental literacy, enable decision making, support scientific advancements and assessments, and inform policymaking. It actively engages the public through regional and sectoral services as well as scientific collaborations. In addition, the Center promotes the scientific integrity and usefulness of its products and services through interactions with data providers, users, and the public.

Access to long time series of environmental data is critical to satisfying the Nation's wide range of business, education, and government needs related to national security, the economy, the environment, and public safety. This includes business and government policies and decisions

which have an impact on water and energy management, manufacturing, transportation, food production, public health, and many other socio-economic issues that depend on quality weather (both Earth and space), climate, ocean, coastal, and geophysical data records and information. Collectively, through the Center for Weather and Climate and Center for Coasts, Oceans, and Geophysics, the NCEI

- Receives over two petabytes (PB) of new data annually;
- Provides access to an archive exceeding 8.7 PB (uncompressed, single copy);
- Has over five PB downloaded annually by customers (FY 2014);
- Supports over one billion web contacts/hits per year; and
- Provides data transfers to over 15 million customers.

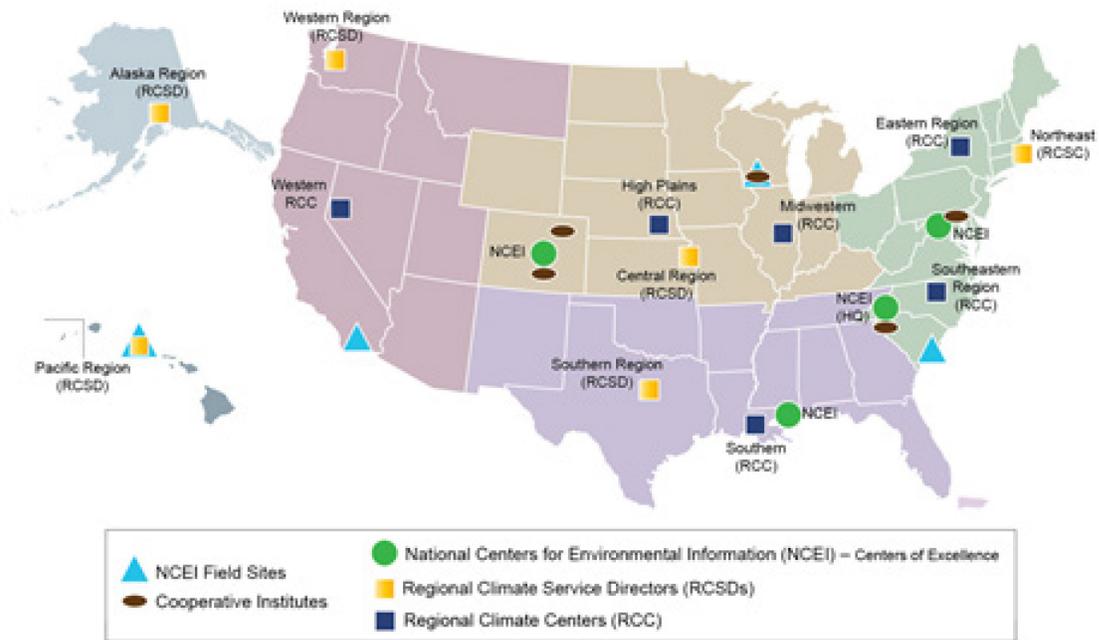
To guarantee the scientific integrity and usefulness of NCEI data and information holdings, the NCEI perform essential data management functions including

- Data acquisition and archival rescue;
- Quality assurance, control, and validation;
- Information preservation (archival), including secure storage, retrieval, and media migration
- Metadata cataloging;
- Processing and reprocessing; and
- Dissemination.

The centers perform quality assurance and reanalysis of historical data, including long-term satellite data records, to establish and update baseline data sets or standards for global/national standards and environmental monitoring using current information technologies.

To support regional, national, and international collaboration, NCEI work includes development of data-centric applied science projects to better understand the cross-sectoral issues and effects of Earth system variation. The NCEI support other NOAA Line/Staff Offices, and national and international contributors and/or users of environmental data and information.

NCEI Geographic Locations



Schedule, Milestones and Deliverables:
National Centers for Environmental Information

Oceanographic and Geophysical Data Services	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
Number of peer reviewed global and coastal ocean data sets products produced. (#/yr)	N/A	1	2	2	2	2	2
Number of data streams automated to the archive (Cum Total #)	N/A	23	25	28	31	34	37
Ingest and archive ocean and coastal mapping data, and make available via standard integrated web services and community-supported formats. (% Increase/yr)	N/A	90% within 90 days of receipt	91% within 90 days of receipt	92% within 90 days of receipt	93% within 90 days of receipt	94% within 90 days of receipt	95% within 90 days of receipt
NOAA fisheries sonar data archived, described, with products available to support ecosystems based management. (% total)	N/A	10%	20%	30%	50%	70%	95%
Volume of operational space weather L2+ data products acquired and archived from available GOES-R series spacecraft. (Cum Total TBs)	N/A	0TB (awaiting launch)	9TB	18TB	27TB	36TB	36TB

Performance Measurement and Data:
National Centers for Environmental Information

Performance Measure: Number of high-priority research grade CDRs developed and transitioned to operational quality standards and sustained by the NOAA CDR Program.(Cum Total)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	23	20	25	28	28	28	28
Description: Operational CDRs are developed and sustained to meet information needs of the food, water, energy, construction, finance, insurance, banking, and health and safety societal sectors. CDRs provide up-to-date entire period of record climate indicators (“Essential Climate Variables”).							

Performance Measure: State of the Climate (SoC) Annual Report - International Representation and Contributors (# Nations represented by Author and Editors contributing to the report content and quality)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	45	47	49	51	53	56	57
Description: Original goal of 42 ECV was largely satisfied, significantly expanding the atmospheric, oceanic and terrestrial variables monitored in the document. Continued growth of the document is not sustainable given budget realities, establishment of a new and different list of ECVs, and availability of data to complete that list. New metric (above) will improve the monitoring of parts of Asia and Africa and contribute to the report's authorial breadth. It measures the increase in the number of contributing authors and editors leading to more robust scientific and comprehensive reports representing more geographical regions (nations) of the world.							

Performance Measure: Annual data receipt rate across all U.S. Climate Reference Network (USCRN) stations in the conterminous U.S. (CONUS), Alaska, and Hawaii. (Annual % Total)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	98%	98%	98%	98%	98%	98%	98%
Description: This measure reflects the minimum data return rate of USCRN data that are ingested on an automated basis from the 114 stations in the CONUS; 16 stations in Alaska (as of the end of FY 2014); and 2 stations in Hawaii. Plans for station numbers in Alaska (number in parentheses) from FY 2015-20 are as follows: FY 2015 (19); FY 2016 (21); FY 2017 (22); FY 2018 (23); FY 2019 (24); and FY 2020 (25).							

Performance Measure: U.S. EEZ (excluding Alaska) depicted with modern seamless elevation (topography-bathymetry) supporting coastal flood forecasting (%/year)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	5%	5%	5%	5%	5%	5%	5%
Description: This measure derives from the Center for Coasts, Oceans and Geophysics and reflects the amount of seafloor described with accurate seamless on-shore and off-shore elevation models supporting coastal flood (hurricane, storm surge, tsunami) forecast and warning, community mitigation efforts, and resilient coastal economies.							

See the Program Change for the proposed schedule/milestones, deliverables, performance goals and measurement data, and the budget profile.

PROGRAM CHANGES FOR FY 2016:

National Centers for Environmental Information (NCEI): Big Earth Data Initiative: (Base Funding: \$933,000 and 0 FTE; Program Change: +\$1,067,000 and +0 FTE): NOAA requests an increase of \$1,067,000 and 0 FTE for a total of \$2,000,000 and 0 FTE to render NOAA's environmental data holdings more accessible and easily useful to other US Agencies and the Nation.

Proposed Actions:

This request, in support of the Big Earth Data Initiative (BEDI), further enables easy, open, and transparent access to NOAA's weather, climate, oceanographic, and geophysical data and derived environmental information. These data and information directly contribute to the Nation's management of its environmental resources and support a broad range of environmental intelligence applications. Funding will directly contribute to modernizing search, discovery and access methods; the provision of descriptive information for all data and information products; and support for the services necessary to transform NOAA's data into machine readable information. Several other US Agencies with substantial earth data holdings (e.g. National Aeronautics and Space Administration (NASA), Department of Interior (DOI), Department of Energy (DOE), United States Department of Agriculture (USDA), Department of Defense (DOD), and others) are also engaged in coordinated, parallel efforts under BEDI.

NOAA's effort will entail

- Compilation of complete descriptive information (metadata) that enables efficient search and discovery through modern tools;
- Construction and publishing of data catalogs;
- Establishing modern "linked data" methods to enable enhanced data discoverability;
- Deploying fast access methods for data delivery through modern IT tools and services;
- Coordination with other US Agencies for BEDI activities through the US Group on Earth (GEO) Data Management Working Group;
- Adoption of industry standards and business practices to facilitate easy machine-to-machine data discovery, transport, visualization, and utilization;
- Publishing of software, algorithms and supporting documentation for NOAA information products to enable their use; and
- Provision of information services required to understand and utilize NOAA data products.

Statement of Need and Economic Benefits:

The Nation has made and continues to make significant investments in earth observing systems, earth system models (e.g. weather and climate), and its data systems. The BEDI concept recognizes that several US Agencies have unique data holdings that would be of great benefit to all Agencies in the meeting their missions. BEDI also acknowledges that each Agency's data systems are not yet designed for the easy sharing of data with other Agencies, and seeks to facilitate this sharing of data and information. Relative to the billions of dollars invested in observing and modeling systems, BEDI will use a small amount of funding to enable the widespread utility of the data collected by these systems so that their impact on and value to the Nation is maximized. BEDI will be able to accomplish these activities with the proposed funding since it builds on the existing infrastructure within the National Centers for Environmental Information (NCEI).

Data stewardship is becoming both more complex and necessary than ever, as non-governmental entities begin to realize and exploit the value of the data collected. As a result,

NCEI's role is becoming more critical, as is the need for funding of data stewardship and science-based data synthesis for issues not yet profitable to National and International users.

This investment will allow NOAA to efficiently fulfill NOAA's Congressional mandate to preserve and provide future generations with access to the Nation's investment in environmental data. It provides essential support of the environmental data needs of the Nation's public, private, and academic sectors. Partners and customers who benefit include Federal, state and local agencies, scientists, researchers, resource managers, businesses, communities, and decision makers that can use the data and information for their strategic planning, actions, and decisions (e.g., building code, power plant design and placement, transportation infrastructure, marine protected area management, agriculture, and ocean energy installation planning).

This investment will also allow NOAA to efficiently fulfill the Administration's mandates on Open and Transparent data, the publishing of publically funded research results, Big Data, and climate change tools and partnerships:

- OMB Memorandum on Open Data Policy - Managing Information as an Asset
- White House OSTP Memorandum Increasing Access to the Results of Federally Funded Scientific Research
- Executive Order "Making Open and Machine Readable the New Default for Government Information"
- White House Announcement on new Actions to Strengthen Global Resilience to Climate Change

Resource Assessment:

Current resources are described in the NCEI narrative

Schedule, Milestones and Deliverables:

Milestones/Deliverables

Number of new data sets made available through BEDI methodology (#/yr)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With increase	N/A	N/A	75	125	175	225	300
Without increase	N/A	N/A	50	75	100	125	150

Performance Goals and Measurement Data:

N/A

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: NESDIS
Sub-program: National Centers for Environmental Information (NCEI)
Program Change: Big Earth Data Initiative (BEDI)

Object Class		FY 2016 Increase	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$0
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	0	0
12	Civilian personnel benefits	0	0
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	20
22	Transportation of things	0	0
23.1	Rental payments to GSA	0	0
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and miscellaneous charges	0	0
24	Printing and reproduction	0	0
25.1	Advisory and assistance services	0	0
25.2	Other services	1,067	1,980
25.3	Purchases of goods & services from Gov't accounts	0	0
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	0
31	Equipment	0	0
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	0
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	1,067	2,000

APPROPRIATION ACCOUNT: PROCUREMENT, ACQUISITION, AND CONSTRUCTION
SUB-PROGRAM: NESDIS SYSTEMS ACQUISITION

NOAA's integrated satellite portfolio provides the backbone that supports the operational data products and data records that our users and the Nation rely upon to drive critical decision-making. Each satellite program contributes a crucial set of observations that meet NOAA satellite's mission essential functions. The FY 2016 request will support NOAA satellite programs in continuing to meet milestones on time and on budget, as well as to plan for future programs and comprehensive engineering solutions.

GOES-R SERIES

Geostationary Operational Environmental Satellite (GOES) observations provide coverage of the western hemisphere from geostationary orbit, allowing continuous monitoring from the same angle during the tracking/detection of severe storms, atmospheric moisture changes, mesoscale scanning, currents flow dynamics, and atmospheric chemicals (particles).

GOES data provide

- Cloud images and precipitation estimates for hurricanes and other coastal storms;
- NOAA Coast Watch sea surface temperature (SST) products for locating commercial and sport fish as well as protected marine species;
- New research products, such as ocean surface currents, that support both ecosystems management and safety of marine navigation;
- Primary information in the Nation's Climate Reference Network, providing reference quality data for surface temperature and precipitation monitoring;
- Images of the United States and adjacent ocean areas to enable the detection of hurricanes and other major weather events;
- Quantitative environmental data collection from remote fixed in-situ observing platforms such as buoys and rain gauges for use in numerical weather prediction models and flood/drought assessments;
- Weather information to emergency managers for use during severe weather and other disasters;
- Unique monitoring capabilities that support air, land, and marine transportation.

The primary function of the GOES program is supporting the NWS in forecasting, tracking, and monitoring severe storms. The GOES satellites have provided essential observational data since 1975. With the launch of GOES-R in 2016, the GOES-R Series will provide significant enhancements directly applicable to all operational users of geostationary observations, in particular the NWS. Increased quantity, quality, and accuracy of satellite data that are processed and distributed within targeted time is a key objective for NWS to issue timely advisories to the public that protect life and property.

In addition to improved hurricane track forecasting, GOES-R will support severe storm forecasting. The 2006 NOAA Economics Statistics Report indicates that lightning activity causes \$4 to \$5 billion in losses each year and that lightning has consistently been one of the top three causes of weather-related deaths. The GOES-R Geostationary Lightning Mapper (GLM) instrument is the first ever operational satellite lightning detection system aboard a geostationary satellite. The GLM detects severe weather by mapping both cloud-to-ground and cloud-to-cloud lightning strikes. By having the GLM capability on GOES-R, NWS aims to provide more accurate severe weather warnings, with the potential to save lives.

The GOES-R program provides end-to-end system development and integration through the acquisition, deployment, maintenance, and operations of the space, ground, and launch segments. NOAA maintains two operational GOES satellites designated as GOES East and GOES West, and further maintains one on-orbit spare positioned midway between them. This on-orbit spare philosophy allows NOAA to quickly replace a failed satellite and ensure continuous coverage by re-positioning the on-orbit spare satellite. To facilitate this strategy, NOAA plans the launch of the next GOES satellite (GOES-R) to coincide with the planned switchover of the on-orbit spare to operational status. Currently, NOAA's GOES-N program includes two operational satellites, GOES-East (GOES-13) and GOES-West (GOES-15), and one on-orbit spare satellite (GOES-14). However, given the transformative increase in capabilities in the GOES-R series, when the satellite is ready for launch in 2016 NOAA will launch GOES-R regardless of the operational status of GOES-13, -14, and -15. The ultimate positioning of GOES-R vis-à-vis GOES-13, -14, and -15 will depend on the health and status of the constellation at that time.

See the Program Change for the proposed schedule/milestones, deliverables, performance goals and measurement data, launch dates, and the budget profile.

SATELLITE ALTIMETRY MISSION – JASON-3

Jason-3 is a satellite altimetry mission implemented jointly by NOAA, the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT), and the Centre Nationale d'Etudes Spatiales (CNES), the French Space Agency. The Jason series has been transitioned as a research endeavor from NASA and CNES to NOAA and EUMETSAT for joint implementation as a sustained and systematic (i.e., operational) capability. Jason-3 will follow in the tradition of the previous altimetry missions, Topex/Poseidon, Jason-1, and Jason-2. Jason-3 will continue and build upon Jason-2 products and services and will provide precise measurement of sea surface height for several applications including, but not limited to, ocean modeling, forecasting El Niño/La Niña events, and hurricane intensity prediction.

See the Program Change for the proposed schedule/milestones, deliverables, performance goals and measurement data, and the budget profile.

JOINT POLAR SATELLITE SYSTEM (JPSS)

JPSS will address NOAA's requirements to provide global environmental data such as cloud imagery, sea surface temperature, atmospheric profiles of temperature and moisture, atmospheric ozone concentrations, Arctic sea ice and coastal ice monitoring, search and rescue, direct read-out, and data collection services. Data from civilian polar-orbiting satellites are the primary input (approximately 85%) for all Numerical Weather Prediction (NWP) models. These data are used in numerical weather prediction models primarily for 2–10 day forecasts, for supporting operational forecasts in Alaska, and for environmental monitoring and forecasting. JPSS represents significant technological and scientific advances in environmental monitoring over current operational systems. Specifically, JPSS data will improve weather forecasts, environmental monitoring, and warning lead times for severe storms, and this will benefit public safety, protection of property, and all weather-sensitive economic activity, such as agriculture, transportation, and energy production.

In addition to supporting NWP models, information from JPSS supports every area of NOAA's mission, including supporting healthy coasts and resilient coastal communities. JPSS improves and extends climate measurements for 30 different Environmental Data Records of the atmosphere, land, ocean, climate and space environment. NOAA's National Ocean Service (NOS) and National Marine Fisheries Service (NMFS) use JPSS data to monitor the health of ocean and coastal ecosystems.

Data from polar satellites are critical for

- Severe storm and flood warnings;
- Tropical cyclone and hurricane reconnaissance and warnings;
- Hydrologic forecasts and forecasts of the ocean surface and internal structures;
- Medium range weather forecast (out to fifteen days);
- Solar and space environmental forecasts;
- Aviation forecasts (domestic, military, and international);
- Forecasts of ice conditions;
- Seasonal and inter-annual climate forecasts;
- Decadal-scale monitoring of climate variability;
- Assessment of long-term global environmental change;
- Environmental air quality monitoring and emergency response;
- Detection and analysis of fires and volcanic eruptions; and
- Short-term and mesoscale forecasts.

JPSS will provide continuity of polar satellite coverage and will improve the Nation's ability to collect and distribute higher resolution data and weather products. This is achieved through the modernization of sensors and systems to ensure improved performance, compatibility, supportability, and maintainability. NOAA has partnered with NASA to implement the JPSS Program, using its space acquisition expertise and acquisition authority to develop the satellites.

See the Program Change for the proposed schedule/milestones, deliverables, performance goals and measurement data, and the budget profile.

Solar Irradiance, Data and Rescue (SIDAR)

The Total Solar Irradiance (TSI) Climate Data Record is important to understanding the Earth's climate variability. The TSI is currently sustained with data from NASA's Solar Radiation and Climate Experiment (SORCE) and the recently (November 2013) launched TSI Calibration Transfer Experiment (TCTE). SORCE is expected to reach end of mission life shortly, and the successor to both SORCE and TCTE (design life of 18 months) is NOAA's Total Solar Irradiance Spectrometer (TSIS). TSIS was developed by NOAA and transitioned to NASA in FY 2015. NASA will launch and operate TSIS, while NOAA will continue to operate the TCTE instrument to provide the bridge between SORCE and TSIS.

To meet essential search and rescue and long-standing satellite environmental data collection requirements, NOAA will continue an important collaboration with the French Space Agency (CNES) and the Canadian Department of National Defence (DND). CNES is providing the A-DCS instrument. A-DCS is a single instrument that provides worldwide in-situ environmental data collection and Doppler-derived location service with the basic objectives of monitoring, studying, and protecting the Earth environment. NOAA will provide access to space for the A-DCS instrument.

DND and CNES jointly provide the SARSAT search and rescue instruments that are part of the international Cospas-Sarsat system designed to detect and locate Emergency Locator Transmitters (ELTs), Emergency Position-Indicating Radio Beacons (EPIRBs), and Personal Locator Beacons (PLBs), enabling the rescue of mariners, aviators, and recreational enthusiasts in distress almost anywhere in the world at any time and in almost any condition. NOAA will provide access to space for the SARSAT instruments.

See the Program Change for the proposed schedule/milestones, deliverables, performance goals and measurement data, and the budget profile.

DEEP SPACE CLIMATE OBSERVATORY (DSCOVR)

The maintenance and operations of the DSCOVR satellite will allow continuity of solar wind data used for geomagnetic storm warnings. NOAA will operate and manage the DSCOVR mission as the front line sentinel to give notice of approaching geomagnetic storms with potentially calamitous consequences for terrestrial electrical grids, communications, GPS navigation, air travel, satellite operations, and human spaceflight. This program was developed in partnership NASA, which refurbished the satellite and developed the ground system, and with the U.S. Air Force (USAF), which provided the launch services for the mission.

NOAA has an operational requirement for continuous solar wind data. Solar wind is the constant stream of charged particles and magnetic fields emitted from the sun. Like terrestrial weather in Earth's atmosphere, space weather refers to conditions like solar wind in the solar system and particularly in near-Earth space. Space weather events can cause geomagnetic storms, and solar wind data are the sole input for short-term warnings (15–45 minutes) of such geomagnetic storms. Geomagnetic storms are the costliest form of space weather and have the greatest potential economic impact on the largest number of customers in every major public infrastructure system.

See the Program Change for the proposed schedule/milestones, deliverables, performance goals and measurement data, and the budget profile.

COSMIC-2/Global Navigation Satellite System Radio Occultation (GNSS RO)

The Constellation Observing System for Meteorology, Ionosphere, and Climate (COSMIC) activity is a six satellite constellation that was launched in 2006 in a joint collaboration between Taiwan, National Science Foundation, NASA, USAF, and University Corporation for Atmospheric Research (UCAR) as a research effort to explore a new, inexpensive atmospheric sounding technique using the U.S. Global Positioning System (GPS) as a sounding signal source. The results were so positive that NOAA started using this data operationally. COSMIC design life was reached in April 2011, one satellite has failed and 2 satellites are in degraded operation, leaving four of the original six satellites in operation.

COSMIC-2 is a continuation of the partnership between the United States (NOAA and USAF) and Taiwan to produce an operational constellation of 12 identical GNSS RO satellites. The COSMIC-2 constellation is expected to provide 10 times the number of daily soundings that COSMIC currently provides, which would increase the benefits to weather forecasting.

See the Program Change for the proposed schedule/milestones, deliverables, performance goals and measurement data, and the budget profile.

SATELLITE GROUND SERVICES (SGS)

The goal of NOAA's Satellite Ground Services (SGS) program is to serve as the single organization for planning and execution of all common ground services for NOAA's satellites. NOAA provides satellite operations, data collection, data processing, distribution, and archiving for multiple satellites and will be adding new satellites (e.g., JPSS, GOES-R, DSCOVR, Jason-3) in the future. Many of the existing ground systems (GS), or ground system components, were developed and are operated specifically for each mission or mission set. The GS variations are usually driven by the latest technology available at the time of the GS development rather than differences in mission requirements. As a result of GS technology differences, the staffing for operations and maintenance of each mission is unique, allowing for only very limited cross-staffing and hardware redundancy.

To improve efficiency, the SGS is developing a common design and architecture that will be implemented across NOAA and will allow for future cost savings. This will be achieved by enhancing staff cross-training, increasing uniformity of infrastructure among sites, and developing common ground services in areas such as command and control, product processing, product generation, and product distribution.

SGS core responsibilities include planning, acquisition, development, integration, transition to operations, and sustainment of common ground services for NOAA's environmental satellite systems. SGS provides engineering and project management for ground systems architecture, design, development, integration and testing, infrastructure, and facilities. In addition, SGS participates in system verification and validation efforts and also in life cycle reviews for satellite acquisition programs and projects.

See the Program Change for the proposed schedule/milestones, deliverables, performance goals and measurement data, and the budget profile.

SYSTEM ARCHITECTURE AND ADVANCED PLANNING (SAAP)

The System Architecture and Advanced Planning (SAAP) program applies systems engineering principles to balance the demands of high technical quality and to meet cost and schedule requirements across NESDIS to ensure and enable the success of NOAA's mission, vision, and objectives. Its core responsibilities include enterprise-level system architecture, advanced system and technology planning, management and technical policies and procedures, and system validation, assurance, and adjudication to ensure that comprehensive solutions meet mission objectives.

In addition to performing top-level requirements of definition, traceability, and final validation and verification, the program serves as the principal advocate for ensuring and enabling the success and mitigating risk of the NESDIS enterprise. This will enable NESDIS to meet its mission, vision, and objectives through systems analysis of current and future enterprise architectures. SAAP maintains enterprise lessons learned, using them toward process improvement for future NESDIS implementation, and serves as the expert technical liaison relating to the end-to-end systems architecture.

See the Program Change for the proposed schedule/milestones, deliverables, performance goals and measurement data, and the budget profile.

PROJECTS, PLANNING, AND ANALYSIS (PPA)

Projects, Planning, and Analysis (PPA) provides leadership and management support of the legacy GOES and POES flight projects, DSCOVR, Jason-3, COSMIC-2, and SIDAR. PPA also contains the Technology, Planning, and Integration for Observations (TPIO) Office, which is responsible for validating NOAA observation analysis and requirements. PPA's core responsibilities include

- Project management and integration for data exploitation opportunities;
- Providing on-orbit anomaly support and sustainment for existing operational systems;
- Conducting studies of requirements definition; planning of overall project and partnership systems;
- Performing conceptual and detailed engineering for these flight project activities;
- Developing and managing the acquisition of partnership-based flight project systems (spacecraft, instruments, and launch services); and

- Coordinating the integration, installation, and acceptance of NOAA civil operational environmental satellites systems for flight projects and partnerships.

As part of this responsibility, PPA administers a comprehensive requirements identification and analysis process and translates requirements for data, products, and services into flight projects, and partnerships. PPA also develops interface standards and uses technical and engineering consultation for system capability, development, implementation, and deployment to serve the environmental remote-sensing satellite user community as well as system performance specifications by current or future satellite systems. PPA performs end-to-end system design studies for flight projects and partnerships, and integrates NESDIS's space and ground concept of operations as applicable.

See the Program Change for the proposed schedule/milestones, deliverables, performance goals and measurement data, and the budget profile.

Geostationary Operational Environmental Satellite - R (GOES-R): GOES-R: (Base Funding: \$980,838,000 and 63 FTE; Program Change: -\$109,047,000 and 0 FTE): NESDIS requests a decrease of \$109,047,000 and 0 FTE for a total of \$871,791,000 and 63 FTE to continue satellite engineering development, production, integration, and launch activities for the four-satellite GOES-R Series Program to deliver required operational capabilities through 2036.

Proposed Actions

NOAA proposes to reduce the GOES-R budget profile by a total of \$109.0 million in FY 2016. The reduction includes \$94.0 million as the planned reduction in the GOES-R program. Additionally, the FY 2016 request is decreased by \$15.0 million achieved by a one week reduction in carryover available to the GOES-R program from FY 2016 to FY 2017. The reduction to the amount of carryover remains within the bounds of the NASA best practices of 6-8 weeks and does not change the program's content or life cycle cost.

The remaining funding is needed to maintain instruments, satellite, and ground system developments that are all currently under contract in order to meet the launch commitment dates of the 2nd Quarter FY 2016 for GOES-R and 3rd Quarter FY 2017 for GOES-S. The funds will also be used to continue the development activities for GOES-T and GOES-U to maintain their launch schedules.

FY 2016 marks a critical juncture as the program prepares the GOES-R satellite for launch. The GOES-R spacecraft will undergo final Integration & Test (I&T), shipping to the launch base, launch processing, and launch. The Ground Segment will be engaged in final I&T activities including critical interface testing with the GOES-R spacecraft and external interfaces, as well as final certification and validation testing for operations. Additionally, GOES-S will begin satellite-level I&T activities.

The planned funding includes reserves consistent with NASA best practices. Remaining funding will be necessary to mitigate the potential schedule impacts to the launch commitment dates for GOES-R and GOES-S.

FY 2016 funding will support

- Completion of GOES-R satellite, ground system, and flight-to-ground integration and test activities;
- Complete GOES-R satellite pre-ship, ship, and launch base activities;
- GOES-R launch service activities, including launch vehicle integration and test, shipment to launch base, and launch base activities;
- Launch of GOES-R;
- Initiation of post launch satellite check-out and calibration activities;
- Completion of fabrication of GOES-S spacecraft hardware and initiation of satellite-level integration;
- GOES-S launch service activities; and
- Fabrication, assembly, and integration of GOES T&U instruments and spacecraft hardware.

Resource Assessment

Current resources are described in the Systems Acquisition narrative.

Schedule and Milestones:

FY 2016:

- Complete GOES-R I&T
- Ship GOES-R to launch site and launch

FY 2017:

- Complete GOES-S I&T
- Ship GOES-S to launch site and launch GOES-R

FY 2018: Prepare for GOES-T launch

FY 2019: Launch GOES-T

FY 2020: Continue GOES-U I&T

Deliverables:

Spacecraft	Launch Readiness Date (LRD)	Launch Commitment Date (LCD)	Target Launch Date (LD)
GOES-R	Q2 FY 2016	Q2 FY 2016	Q2 FY 2016
GOES-S	Q3 FY 2017	Q3 FY 2017	Q3 FY 2017
GOES-T	Q3 FY 2019	Q3 FY 2019	TBD
GOES-U	Q1 FY 2021	Q1 FY 2025	TBD

Performance Goals and Measurement Data:

Performance Measure: Percent of GOES-R Program milestones complemented on time	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Decrease	N/A	N/A	75%	75%	75%	75%	75%
Without Decrease	N/A	N/A	75%	75%	75%	75%	75%
Description: Percent of projected milestones to be completed annually to meet the planned operational dates for GOES-R series (GOES-R, -S, -T, and -U). This includes key decision points, major reviews, testing, and delivery for the spacecraft, instruments (ABI, GLM, EXIS, SUVI, and SEISS), as well as antenna and ground segments.							

Outyear Funding Estimates* (\$ in thousands):

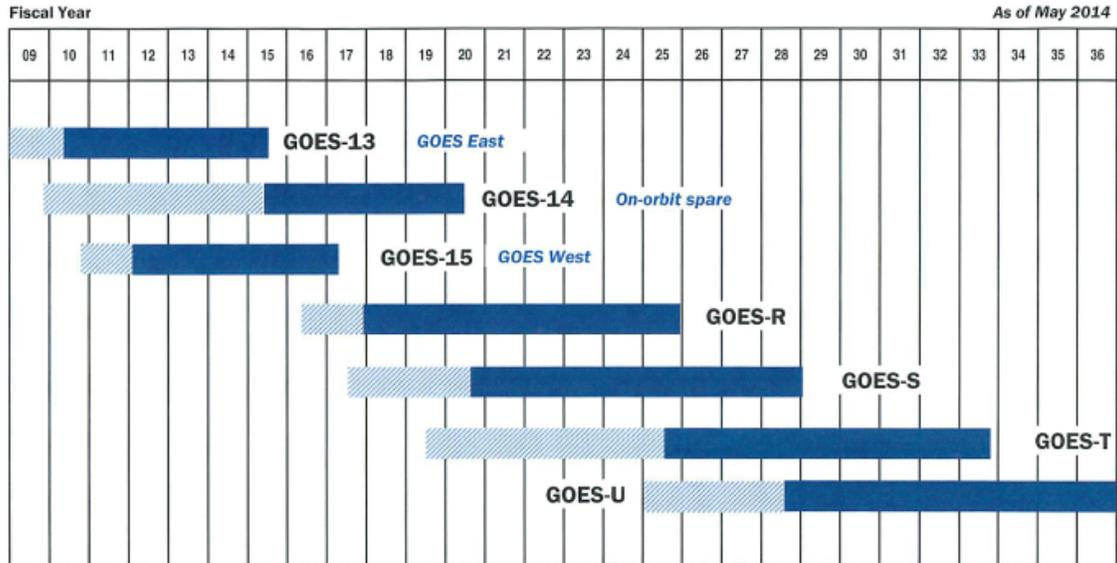
GOES-R	FY 2015 & Prior	FY 2016	FY 2017	FY 2018	FY 2019**	FY 2020	CTC	Total
Change from FY 2016 Base		(109,047)	(194,154)	(457,789)	(616,806)	(713,973)		
Total Request	6,087,084	871,791	786,684	523,049	364,032	266,865	1,928,554	10,828,059

*Outyears are estimates only. Future requests will be determined through the annual budget process.

**Funding reduction of \$15.0M taken in FY 2016 is phased into the FY 2019 request.



Continuity of GOES Mission



Approved: *Manuel E. Torres*
 Assistant Administrator for Satellite and Information Services

GOES: Geostationary Operational Environmental Satellite

On-orbit storage

Operational

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: NESDIS
Sub-program: Systems Acquisition
Program Change: GOES-R Series

Object Class	FY 2016 Decrease	FY 2016 Total Program
11 Personnel compensation		
11.1 Full-time permanent	\$0	\$6,921
11.3 Other than full-time permanent	0	46
11.5 Other personnel compensation	0	89
11.8 Special personnel services payments	0	0
11.9 Total personnel compensation	0	7,056
12 Civilian personnel benefits	0	1,855
13 Benefits for former personnel	0	0
21 Travel and transportation of persons	0	364
22 Transportation of things	0	1
23.1 Rental payments to GSA	0	2,226
23.2 Rental Payments to others	0	0
23.3 Communications, utilities and miscellaneous charges	0	313
24 Printing and reproduction	0	0
25.1 Advisory and assistance services	0	0
25.2 Other services	0	0
25.3 Purchases of goods & services from Gov't accounts	(109,047)	650,581
25.4 Operation and maintenance of facilities	0	0
25.5 Research and development contracts	0	0
25.6 Medical care	0	0
25.7 Operation and maintenance of equipment	0	0
25.8 Subsistence and support of persons	0	0
26 Supplies and materials	0	107
31 Equipment	0	198,895
32 Lands and structures	0	0
33 Investments and loans	0	0
41 Grants, subsidies and contributions	0	10,392
42 Insurance claims and indemnities	0	0
43 Interest and dividends	0	1
44 Refunds	0	0
99 Total obligations	(109,047)	871,791

Jason-3: Jason-3: (Base Funding: \$23,175,000 and 3 FTE; Program Change: -\$15,717,000 and 0 FTE): NOAA requests a planned decrease of \$15,717,000 and 0 FTE for a total of \$7,458,000 and 3 FTE to continue post launch operations of the Jason-3 satellite in partnership with European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT) and Centre National d'Etudes Spatiales (CNES), NOAA's European and French partners.

Proposed Actions:

NOAA proposes to follow the established Jason-3 budget profile, reducing the program by \$15.7 million in FY 2016. NOAA will support routine post-launch operations of the Jason-3 satellite to include ingestion, processing and distribution of the data, and providing essential engineering services to sustain operations in the event of space or ground based anomalies. Within this budget, NOAA will also complete the evaluation of the Jason-3 satellite and instrument performance during the calibration and validation of all satellite data and will support continued Jason-3 satellite operations per our interagency commitment with EUMETSAT and CNES.

This budget request supports NOAA's responsibility to provide post-launch operations for the Jason-3 mission. NOAA will work with NASA, OSTP, and OMB to transition the acquisition, development and sustainment of future space-based ocean altimetry systems to NASA.

The FY 16 President's Budget supports NOAA's broad environmental mission and redefines NASA and NOAA earth observing responsibilities whereby NOAA will be responsible for satellite missions that directly contribute to NOAA's ability to issue weather and space weather forecasts and warnings to protect life and property.

Resource Assessment:

The resources for this activity are described in the Systems Acquisition narrative.

Schedule and Milestones:

FY 2016-2020: Initiate and continue routine operations

Deliverables:

- Continue more than 20 years of sea level observations, a critical climate monitoring variable, and provide operational ocean weather products using Jason-3 observations

Spacecraft	Launch Readiness Date (LRD)	Launch Commitment Date (LCD)	Target Launch Date (LD)
Jason-3	Q2 FY 2015	Q2 FY 2015	Q2 FY 2015

Performance Goals and Measurement Data:

Performance Measure: Number of ocean science products produced	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Decrease	N/A	N/A	5	5	5	5	5
Without Decrease	N/A	N/A	5	5	5	5	5
Description: Jason-3 altimetry products will provide important data for ocean climatology studies and ocean weather forecasting. Products are Sea Level Height, El Niño/La Niña Forecast, Hurricane Intensity Forecasting, Ocean Wave height Forecast, and Ocean Surface Current.							
Note: Jason-2 creates five data products currently. These products will be the same five that are generated by the Jason-3 mission.							

Outyear Funding Estimates* (\$ in thousands):

Jason-3	FY 2015 & prior	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	CTC	Total
Change from FY 2016 Base		(15,717)	(15,887)	(15,910)	(15,979)	(23,175)	0	
Total Request	148,006	7,458	7,288	7,265	7,196	0	0	177,213

*Outyears are estimates only. Future requests will be determined through the annual budget process.

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: NESDIS
 Sub-program: Systems Acquisition
 Program Change: Jason - 3

Object Class		FY 2016 Decrease	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$630
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	0	630
12	Civilian personnel benefits	0	70
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	25
22	Transportation of things	0	0
23.1	Rental payments to GSA	0	35
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and miscellaneous charges	0	5
24	Printing and reproduction	0	0
25.1	Advisory and assistance services	0	0
25.2	Other services	0	0
25.3	Purchases of goods & services from Gov't accounts	(15,717)	6,681
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	5
31	Equipment	0	7
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	0
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	(15,717)	7,458

Joint Polar Satellite System (JPSS): JPSS: (Base Funding: \$916,267,000 and 97 FTE; Program Change: -\$107,301,000 and 0 FTE): NOAA requests a decrease of \$107,301,000 and 0 FTE for a total of \$808,966,000 and 97 FTE for the JPSS. These funds will operate and sustain the Suomi National Polar Partnership satellite (S-NPP) and continue development of the instruments, ground system, and spacecraft for JPSS-1 and JPSS-2.

Proposed Actions:

NOAA proposes to reduce JPSS by \$107.3 million in FY 2016. The reduction includes a planned reduction of \$82.3 million to the established budget profile. Additionally, the FY 2016 request is decreased by \$25.0 million achieved by a one week reduction in the carryover available to the JPSS program from FY 2016 into FY 2017. The reduction to carryover remains within the bounds of the NASA best practices of 6-8 weeks and does not change the program's content and life cycle costs, consistent with the 2013 Program baseline with life cycle cost of \$11.3 billion.

NOAA continues to take steps within JPSS to help build a robust¹ polar orbiting weather satellite program as rapidly as practicable. As such, NOAA will continue to prioritize meeting the JPSS-1 launch commitment date and maintain the accelerated JPSS-2 launch readiness date.

FY 2016 funds will be used to support the following activities

- Operate and sustain the S-NPP satellite which was launched October 28, 2011.
- Continue ground system operations for S-NPP under the Block 1.2X until it is retired, complete development and deployment of the new Block 2.0 upgrade, and perform integration testing of the Block 2.0 with the JPSS-1 flight segment to get ready for JPSS-1 launch.
- Complete testing the JPSS-1 integrated spacecraft, prepare for JPSS-1 launch site integration and testing (I&T).
- Continue with preparation for launch vehicle and services for JPSS-1 for launch by no later than 2nd quarter of FY 2017.
- Continue the development of JPSS-2 spacecraft and instruments.
- Support capability to launch JPSS-2 targeted by 4th quarter FY 2021.

Resource Assessment:

The resources for this activity are described in the Systems Acquisition narrative.

Schedule and Milestones:

FY 2016:

- Continue JPSS-1 I&T
- Continue JPSS-2 spacecraft and instrument builds
- Continue preparation of JPSS-1 launch services
- Execute JPSS-1 mission reviews including operational readiness and mission readiness reviews
- Validate ground system readiness for JPSS-1
- Transition Ground Block 2.0 to operations
- Continue operations and sustainment of S-NPP

¹ A "robust" architecture has two characteristics: (1) two failures must occur to create a gap in sounding data from ATMS or CrIS instruments and (2) the ability exists to restore the constellation to a two-failure condition within one year.

FY 2017:

- Launch and operate JPSS-1
- Commission JPSS-1 and begin calibration/validation of JPSS-1 data products
- Continue build of JPSS-2
- Continue to operate and sustain S-NPP

FY 2018:

- Continue build of JPSS-2 instruments and spacecraft
- Plan for launch services for the JPSS-2 mission
- Continue to operate and sustain S-NPP (secondary) and JPSS-1 (primary)

FY 2019:

- Continue build of JPSS-2 instruments and spacecraft
- Continue operations and sustainment of S-NPP and JPSS-1

FY 2020: Sustain and maintain S-NPP and JPSS-1; perform JPSS-2 I&T

Deliverables:

- The major activities and outcomes planned in FY 2016 are the continued development of the JPSS-1 spacecraft, including I&T with VIIRS, CrIS, ATMS, and OMPS-Nadir instruments, to support a launch commitment date of no later than 2nd Quarter FY 2017 for JPSS-1

Spacecraft	Launch Readiness Date (LRD)	Launch Commitment Date (LCD)	Target Launch Date (LD)
Suomi-NPP	N/A	N/A	October 28, 2011
JPSS-1	Q1 FY 2017	No later than Q2 FY 2017	Q2 FY 2017
JPSS-2	Q4 FY 2021	No later than Q1 FY 2022	TBD

Performance Goals and Measurement Data:

Performance Measure: Percent of JPSS Program milestones complemented on time	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Decrease	N/A	N/A	75%	75%	75%	75%	75%
Without Decrease	N/A	N/A	75%	75%	75%	75%	75%

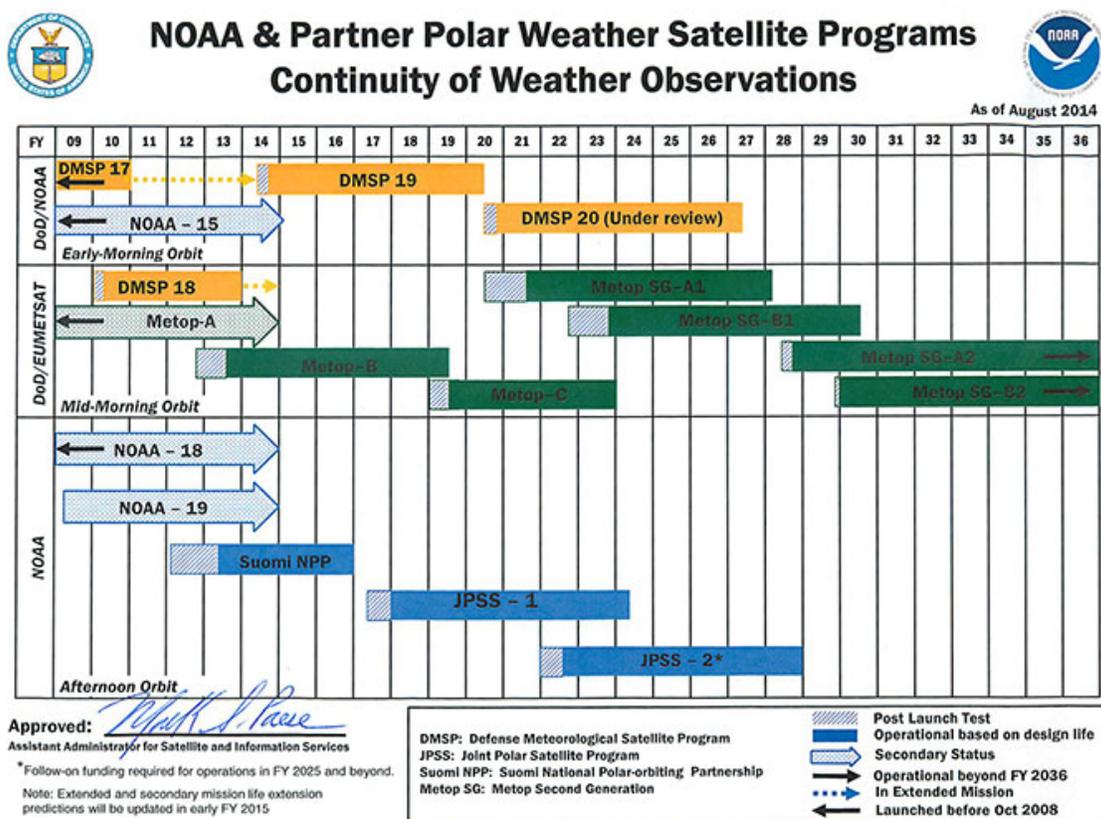
Description: Percent of projected annual program oversight and technical management milestones completed each year to meet the LRD for JPSS-1 and JPSS-2. This includes key decision points, major reviews, testing, and delivery of the following instruments: VIIRS, CrIS, ATMS, CERES, and OMPS-Nadir (JPSS-1 satellite); VIIRS, CrIS, ATMS and OMPS-Nadir (JPSS-2 satellite).

Outyear Funding Estimates* (\$ in thousands):

JPSS	FY 2015 & Prior	FY 2016	FY 2017	FY 2018	FY 2019**	FY 2020	CTC	Total
Change from FY 2016 Base		(107,301)	(119,021)	(180,490)	(357,464)	(476,761)		
Total Request	6,852,002	808,966	797,246	735,777	558,803	439,506	1,129,825	11,322,125

*Outyears are estimates only. Future requests will be determined through the annual budget process.

**Funding reduction of \$25.0M taken in FY 2016 is phased into the FY 2018 request.



PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: NESDIS
Sub-program: Systems Acquisition
Program Change: Joint Polar Satellite System (JPSS)

Object Class		FY 2016 Decrease	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$12,507
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	64
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	0	12,571
12	Civilian personnel benefits	0	2,679
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	313
22	Transportation of things	0	47
23.1	Rental payments to GSA	0	0
23.2	Rental Payments to others	(1,086)	100
23.3	Communications, utilities and miscellaneous charges	0	0
24	Printing and reproduction	0	0
25.1	Advisory and assistance services	0	0
25.2	Other services	7,700	7,700
25.3	Purchases of goods & services from Gov't accounts	(110,706)	771,986
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	(258)	100
31	Equipment	(1,179)	270
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	(1,772)	13,200
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	(107,301)	808,966

Polar Follow On (PFO): PFO: (Base Funding: \$0 and 0 FTE; Program Change: +\$380,000,000 and 6 FTE): NOAA requests an increase of \$380,000,000 and 6 FTE for a total of \$380,000,000 and 6 FTE to initiate the PFO.

Proposed Actions:

NOAA is focused on achieving polar weather constellation robustness² as early as FY 2023. The request funds the following actions to ensure continuity of NOAA's polar weather observations

- Initiates development to support launch readiness dates of Q2 FY 2024 for JPSS-3 and Q3 FY 2026 for the JPSS-4 missions.
- Provides the option for a JPSS-3 contingency mission with critical sounders Advanced Technology Microwave Sounder (ATMS) and Cross-track Infrared Sounder (CrIS) only.
- Invests in development of an advanced technology Earth Observing Nanosatellite-Microwave (EON-MW).

PFO will extend operations of the overall polar satellite system to as far as FY 2038 and is essential to maintaining continuity of polar observations through this period, ensuring NOAA continues to provide accurate and timely weather forecasts and warnings beyond JPSS-2. NOAA will manage the PFO as an integrated single program with JPSS to incorporate efficiencies planned and implemented under JPSS. However, the budget for the integrated program will be reflected as two PPAs: JPSS and PFO.

Authorizing the PFO in FY 2016 reduces the risk of a JPSS gap following the launch of JPSS-2 and maximizes the advantage from the JPSS program investments to date. PFO leverages the experience of S-NPP operations and JPSS-1 acquisition to reduce schedule, risk and life cycle costs for the follow on satellites. The full JPSS-3 and- 4 missions comprise of ATMS, CrIS, Visible Infrared Imaging Radiometer Suite (VIIRS), and the Ozone Mapping Profiler Suite-Nadir (OMPS-N). NOAA is basing the development of the JPSS-3 and JPSS-4 instruments and spacecraft bus on JPSS-2, which allows the PFO to take advantage of the ongoing JPSS instrument development to reduce cost and risk and do simultaneous instrument block buy for JPSS-3 and JPSS-4 instruments for the most efficient acquisition strategy and production cadence.

As part of the robust architecture for the polar satellite system, the PFO includes two mitigation activities in the event of a near term (prior to FY 2020) or mid-term (early-2020s) loss of polar observations. To mitigate the loss of microwave sounder data on JPSS-1, the FY 2016 request allocates \$10 million to initiate the development of an advanced technology EON-MW. EON-MW would provide some of the capabilities of the ATMS instrument, including atmospheric temperature and moisture readings. To mitigate the impact of a premature failure of JPSS-2, PFO supports the option to launch JPSS-3 early with critical sounders only. This contingency mission would include only ATMS and CrIS instruments, and, if exercised, would replace the full JPSS-3 mission. If the contingency is not exercised, the full JPSS-3 mission (ATMS, CrIS, VIIRS, OMPS-N) would continue as planned. Should the contingency mission be necessary, NOAA would use the then-built VIIRS and OMPS-N instruments for integration onto JPSS-4; however, the Administration will survey the overall health of the VIIRS and OMPS-N

² A "robust" architecture has two characteristics: (1) two failures must occur to create a gap in data from ATMS or CrIS and (2) the ability exists to restore a two-failure condition within one year of an on-orbit failure.

measurements at that point in time to determine an appropriate course for using the instruments.

As part of the FY 2016 Budget, NOAA requests funding to begin procurement of a set of six radio occultation (RO) sensors as part of the COSMIC 2 mission. Polar orbiting radio occultation sensors are critical to help mitigate the impacts of a potential loss of sounders in that orbit. Further details regarding NOAA's investment in RO sensors are provided in the Program Change description for that program.

Statement of Need and Economic Benefits:

The observations provided by the JPSS satellites are among the highest priority measurements identified in the Administration's *National Plan for Civil Earth Observations*. Data and imagery obtained from JPSS satellites will help increase timeliness, accuracy, and cost effectiveness of public warnings and forecasts of climate and weather events, thus reducing the potential loss of human life and property and allowing proactive steps to protect the Nation's economy. Immediate development of the mission to follow JPSS-2 is necessary to sustain this essential Earth observing satellite capability and to continue to meet the Nation's weather, storm-prediction, and environmental monitoring requirements. The November 2013 NESDIS Satellite Enterprise Independent Review Team (IRT) recommended NOAA work to achieve robustness as rapidly as possible and to manage JPSS-2, JPSS-3, and JPSS-4 as an integrated program. This budget request achieves those elements of the IRT recommendation.

Schedule and Milestones:

FY 2016:

- Initiate development of JPSS-3 and JPSS-4 instruments and initiate instrument parts procurement
- Initiate sub-assembly and parts manufacture for JPSS-3 and JPSS-4 instruments
- Initiate EON-MW design, and development of EON-MW flight and ground software, build Engineering Design Unit (EDU) and begin purchasing EON long-lead parts

FY 2017:

- Continue JPSS-3 and JPSS-4 parts procurement and build sub-assemblies for JPSS-3 and JPSS-4 instruments
- Complete and test EON-MW EDU, develop and test flight software and, begin developing ground system software and identify and select flight opportunity

FY 2018:

- Continue build of JPSS-3 and JPSS-4 instruments, and exercise option for the JPSS-3 spacecraft bus
- Complete the build of EON-MW flight unit and ground system hardware and software, and begin integration and testing of EON-MW end-to-end system and hardware

FY 2019:

- Continue build of JPSS-3 and JPSS-4 instruments, and develop JPSS-3 contingency mission capability, should it be required
- Exercise option for the JPSS-4 spacecraft bus
- Complete EON-MW integration and testing, launch EON-MW, and begin operations

FY 2020:

- Complete JPSS-3 instrument integration and begin instrument testing
- Continue build of JPSS-4 instruments
- Continue development of JPSS-3 contingency mission capability
- Continue JPSS-3 and JPSS-4 bus builds
- Continue EON-MW operations

Deliverables:

Spacecraft	Launch Readiness Date (LRD)
EON-MW	Q1 FY 2019
JPSS-3 Contingency Mission	Q3 FY 2023* (if necessary)
JPSS-3	Q2 FY 2024*
JPSS-4	Q3 FY 2026*

*Launch dates (LCD and LD) will be determined based on the performance of on-orbit assets.

Performance Goals and Measurement Data:

Performance Measure:	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
Percent of Polar Follow On milestones complemented on time							
With Increase	N/A	N/A	75%	75%	75%	75%	75%
Without Increase	N/A						
Description: Percentage of projected annual program oversight and technical management milestones completed each year to meet the LRD for JPSS-3 Contingency Mission, JPSS-3, JPSS-4, and EON-MW. This includes key decision points, major reviews, testing, and delivery for the antenna, ground segments and the following instruments: VIIRS, CrIS, ATMS, and OMPS-Nadir.							

Outyear Funding Estimates* (\$ in thousands):

Polar Follow-On**	FY 2015 & Prior	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	CTC	Total
Change from FY 2016 Base		380,000	430,000	589,000	579,000	577,000	-	-
PFO		370,000	430,000	589,000	579,000	577,000	TBD	TBD
EON-MW		10,000	8,000	5,000	2,000	2,000	0	27,000
Total Request*	\$0	380,000	438,000	594,000	581,000	579,000	TBD	TBD

*Outyears are estimates only. Future requests will be determined through the annual budget process.

**The preliminary phasing of funds provided in the budget profile is based on an Initial Formulation Estimate, and is subject to change.

PROGRAM CHANGE PERSONNEL DETAIL

Budget Program: NESDIS
Sub-program: Systems Acquisition
Program Change: Polar Follow On

Title:	Location	Grade	Number of Positions	Annual Salary	Total Salaries
Physical Scientist	Lanham, MD	GM-15-1301	1	154,160	154,160
Budget Analyst	Lanham, MD	GS-14-0560	2	131,053	262,106
Program Analyst	Lanham, MD	GS-14-0343	1	131,053	131,053
General Engineer	Lanham, MD	GM-15-0801	1	154,160	154,160
General Engineer	Lanham, MD	GS-14-0801	1	131,053	131,053
Aerospace Engineer	Lanham, MD	GM-15-0861	2	154,160	308,320
Subtotal			<u>8</u>		<u>1,140,852</u>
2015 Pay Adjustment (1.0%)					11,409
Total					1,152,261
less Lapse		25%	<u>-2</u>		<u>-285,213</u>
Total full-time permanent (FTE)			6		855,639
2016 Pay Adjustment (1.3%)					11,123
TOTAL					<u>866,762</u>

Personnel Data

	Number
Full-Time Equivalent Employment	
Full-time permanent	6
Other than full-time permanent	0
Total	<u>6</u>

Authorized Positions:

Full-time permanent	8
Other than full-time permanent	0
Total	<u>8</u>

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: NESDIS
Sub-program: Systems Acquisition
Program Change: Polar Follow On

Object Class		FY 2016 Increase	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	\$867	\$867
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	867	867
12	Civilian personnel benefits	350	350
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	75	75
22	Transportation of things	0	0
23.1	Rental payments to GSA	0	0
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and miscellaneous charges	0	0
24	Printing and reproduction	0	0
25.1	Advisory and assistance services	0	0
25.2	Other services	10,000	10,000
25.3	Purchases of goods & services from Gov't accounts	368,612	368,612
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	16	16
31	Equipment	80	80
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	0
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	380,000	380,000

Solar Irradiance, Data and Rescue (SIDAR): User Services Accommodation: (Base Funding: \$7,300,000 and 0 FTE; Program Change: -\$6,800,000 and 0 FTE): NOAA requests a decrease of \$6,800,000 and 0 FTE for a total of \$500,000 and 0 FTE to plan for the accommodation of the Argos Advanced Data Collection System (A-DCS) and Search and Rescue Satellite Aided Tracking (SARSAT) instruments. The Total Solar Irradiance Spectrometer (TSIS) instrument was developed by NOAA and transitioned to NASA in FY 2015.

SARSAT provides satellite search and rescue services, and A-DCS provides environmental data collection and relay.

Proposed Actions:

This request will allow NOAA to plan the accommodation for A-DCS and SARSAT for launch in FY 2019. NOAA will work with OMB, OSTP and NASA to develop a plan for the accommodation of these instruments. The French Space Agency (CNES) and the Department of National Defence – Canada (DND) are jointly providing the SARSAT instrument and CNES is providing the A-DCS instruments. Both CNES and DND have already contributed approximately \$100M to the project.

The Solar Irradiance measurements initially conceived as a part of NOAA’s SIDAR program have been taken up by NASA. NASA will launch and operate TSIS beginning in FY 2016. NOAA will continue to operate the Total Solar Irradiance Calibration Transfer Experiment (TCTE) instrument to provide the bridge between the Solar Radiation and Climate Experiment (SORCE) and TCTE. In FY 2016 and beyond, the SIDAR program will consist of A-DCS and SARSAT.

Resource Assessment:

The resources for this activity are described in the System Acquisition narrative.

Schedule and Milestones:

FY 2016: Initiate plan to accommodate the A-DCS and SARSAT instruments
 FY 2017: Complete the plan and recommended approach to accommodate A-DCS and SARSAT

Deliverables:

- Recommended approach for accommodation of A-DCS and SARSAT instruments

Mission	Launch Readiness Date (LRD)	Launch Commitment Date (LCD)	Target Launch Date (LD)
User Services	Q4 FY 2019	TBD	TBD

Performance Goals and Measurement Data:

N/A

Outyear Funding Estimates* (\$ in thousands):

User Services	FY 2015 & Prior	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	CTC	Total
Change from FY 2016 Base		(6,800)						
Total Request	7,300	500	TBD	TBD	TBD	TBD	TBD	7,800

* The formulation of life cycle costs will be provided once the plan for accommodation of A-DCS and SARSAT instruments is complete.

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: NESDIS
Sub-program: Systems Acquisition
Program Change: SIDAR: User Services Accommodation

Object Class		FY 2016 Decrease	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$0
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	0	0
12	Civilian personnel benefits	0	0
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	0
22	Transportation of things	0	0
23.1	Rental payments to GSA	0	0
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and miscellaneous charges	0	0
24	Printing and reproduction	0	0
25.1	Advisory and assistance services	0	0
25.2	Other services	0	0
25.3	Purchases of goods & services from Gov't accounts	(6,800)	500
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	0
31	Equipment	0	0
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	0
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	(6,800)	500

Deep Space Climate Observatory (DSCOVR): DSCOVR: (Base Funding: \$21,100,000 and 4 FTE; Program Change: -\$17,900,000 and 0 FTE): NOAA requests a planned decrease of \$17,900,000 and 0 FTE for a total of \$3,200,000 and 4 FTE to support routine maintenance and operations of the refurbished DSCOVR satellite.

Proposed Actions:

NOAA proposes to follow the established DSCOVR budget profile, reducing the program by \$17.9 million in FY 2016. With the planned budget, NOAA will continue to support routine post-launch maintenance and operations for the DSCOVR mission. The funds will be used for sustaining engineering support for the Mission Operations Center (MOC) located at the NOAA Satellite Operations Facility (NSOF) in Suitland, MD. NOAA will provide mission operations, ground systems maintenance, and data processing and archiving. Additionally, NOAA will also provide on-orbit support and enhancements to the ground system.

DSCOVR will be positioned between Earth and the sun, observing and providing advanced warning of particles and magnetic fields emitted by the sun, known as solar wind. Like terrestrial weather in Earth’s atmosphere, space weather refers to conditions, like solar wind, in near-Earth space. From its post at the Lagrange point 1 (or L1), approximately one million miles from Earth, DSCOVR will be positioned to provide early warning when the solar wind displays characteristics that cause a geomagnetic storm. Solar wind observations are the only data source to support 15 to 45 minute lead time for geomagnetic storm warnings.

DSCOVR will also carry two earth remote sensing instruments provided by NASA. The Earth Polychromatic Camera (EPIC) that will take continuous full disk images of Earth and the NIST Advanced Radiometer (NISTAR) that will take continuous full disk measurements of the earth's radiation balance. NOAA will provide the level 0 data stream to NASA, and NASA will provide data processing and all higher level data products.

Resource Assessment:

The resources for this activity are described in the Systems Acquisition narrative.

Schedule and Milestones:

FY 2016-2019: Continue maintenance and operations

The mission design life for the DSCOVR mission is through 2019.

Deliverables:

- Provide timely access to operational solar wind data for geomagnetic storm warnings

Spacecraft	Launch Readiness Date (LRD)	Launch Commitment Date (LCD)	Target Launch Date (LD)
DSCOVR	Q2 FY 2015	Q2 FY 2015	Q2 FY 2015

Performance Goals and Measurement Data:

Performance Measure: Lead Time Geomagnetic Storm Warnings (minutes)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target
With Decrease	N/A	N/A	40	40	40	40
Without Decrease	N/A	N/A	40	40	40	40
Description: This is a Space Weather Prediction Center (SWPC) performance measure that represents the average number of minutes of warning before geomagnetic storm arrival once SWPC receives real-time data regarding geomagnetic storm arrival, the alert is posted on their website, and email alerts are sent to customers that subscribe. SWPC will also contact high impact customers such as Federal Emergency Management Agency (FEMA), Coast Guard, power distributors, airlines, etc. This measure also assumes that NASA's Advanced Composition Explorer satellite continues until the launch of DSCOVR.						

Performance Measure: Percentage of warnings issued prior to geomagnetic storm	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target
With Decrease	N/A	N/A	100%	100%	100%	100%
Without Decrease	N/A	N/A	100%	100%	100%	100%
Description: This is a SWPC performance measure that ensures issuance of warnings for all geomagnetic storms. Once SWPC receives real-time data regarding geomagnetic storm arrival, the alert is posted on their website and email alerts are sent to customers. SWPC will also contact high impact customers such as FEMA, Coast Guard, power distributors, airlines, etc. This measure also assumes NASA's Advanced Composition Explorer satellite continues until the launch of DSCOVR.						

Performance Measure: Percentage of alerts delivered within 10 minutes of onset of geomagnetic storm	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target
With Decrease	N/A	N/A	98%	98%	98%	98%
Without Decrease	N/A	N/A	98%	98%	98%	98%
Description: This measure is a SWPC performance measure that ensures issuance of warnings for all geomagnetic storms. Once SWPC receives real-time data regarding geomagnetic storm arrival, the alert is posted on their website and email alerts are sent to customers. SWPC will also contact high impact customers such as FEMA, Coast Guard, power distributors, airlines, etc. This measure also assumes NASA's Advanced Composition Explorer satellite continues until the launch of DSCOVR.						

Outyear Funding Estimates* (\$ in thousands):

DSCOVR	FY 2015 & Prior	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	CTC	Total
Change from FY 2016 Base		(17,900)	(18,700)	(19,031)				
Total Request	\$97,094	3,200	2,400	2,069	0	0	0	104,763

*Outyears are estimates only. Future requests will be determined through the annual budget process.

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: NESDIS
Sub-program: Systems Acquisition
Program Change: DSCOV

Object Class		FY 2016 Decrease	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$490
11.3	Other than full-time permanent	0	3
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	0	493
12	Civilian personnel benefits	0	70
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	7
22	Transportation of things	0	0
23.1	Rental payments to GSA	0	28
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and miscellaneous charges	0	6
24	Printing and reproduction	0	0
25.1	Advisory and assistance services	0	352
25.2	Other services	0	54
25.3	Purchases of goods & services from Gov't accounts	(17,900)	875
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	10
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	13
31	Equipment	0	86
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	1,206
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	(17,900)	3,200

Space Weather Follow On: Space Weather Follow On: (Base Funding: \$0 and 0 FTE; Program change: +\$2,500,000 and 0 FTE): NOAA requests an increase of \$2,500,000 and 0 FTE for a total of \$2,500,000 and 0 FTE to plan and initiate development of the Space Weather Follow On program.

Proposed Actions:

NOAA requests an increase of \$2.5 million in FY 2016 to analyze options from the Analysis of Alternatives (AoA) for critical space weather observations and to initiate development of the Space Weather Follow On mission. This entails developing preliminary versions of Level 1 Requirements, Concept of Operations, and program schedule for solar wind data and coronal mass ejection (CME) imagery for the program's key decision point review, Key Decision Point-A. The Space Weather Follow On program will be configured in consultation with NASA, interagency and international partners and consistent with the goals outlined in the National Space Weather Strategy that is being developed by Space Weather Operations Research and Mitigation Task Force.

Statement of Need and Economic Benefits:

Solar wind data are the sole input for short-term warnings (15–45 minutes) of geomagnetic storms. CME imagery is the model input for the 1–4 day warning of geomagnetic storm conditions. In order to ensure data continuity following DSCOVR for solar wind data, NOAA must initiate studies and planning to replace the data in FY 2016.

NOAA will be relying on the refurbished DSCOVR spacecraft, a single string mission that is scheduled to launch in FY 2015 to provide solar wind data. DSCOVR will replace Advanced Composition Explorer (ACE)-derived products and services, which are widely regarded as the single most important operational space weather capability presently available. This unique asset provides an accurate and robust 15–45 minute advanced warning for the onset, intensity, and duration of geomagnetic storms. Loss of DSCOVR without a replacement will reduce NOAA's ability to warn of impending space weather storms.

The Solar and Heliospheric Observatory (SOHO) and Solar Terrestrial Relations Observatory (STEREO) missions, launched in 1995 and 2006 respectively, are the lone sources for earth-directed CME images. There is a very high risk of a data gap for CME imagery as SOHO and STEREO are significantly past their mission design lifetimes, and currently no coronagraph is planned for any NASA mission. CME imagery is currently used operationally and is a key observation for improving space weather forecasts. Without CME imagery, the 1–4 day lead-time of likely storm conditions could be degraded and could affect the accuracy of geomagnetic storm watches issued to customers. NOAA will analyze options to acquire CME imagery assets to support the overall mission in cooperation with NASA and other stakeholders.

Geomagnetic storms have great potential economic impact on the largest number of customers. Without timely and accurate alerts and warnings, space weather has the potential to disrupt significant portions of the commerce infrastructure, including transportation systems, power grids, telecommunications, and GPS satellites. NOAA will supply geomagnetic storm warnings to support key industries such as the commercial airline, electric power, and GPS industries. For example, aircraft flying polar routes now include space weather as an integral part of pilots' weather pre-briefs, which provide the status of the flight environment including potential impacts to critical communication and navigation systems and the potential for hazardous solar radiation exposure.

Resource Assessment:

The resources for this activity are described in the Systems Acquisition narrative.

Schedule and Milestones:

FY 2016: Complete AoA and initiate selected development options; successful completion of KDP-A

Deliverables:

- Preliminary versions of Level 1 Requirements, Concept of Operations, and program schedule

Performance Goals and Measurement Data:

Performance Measure: Geomagnetic storm forecast accuracy	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	53%	54%	55%	56%	15%
Without Increase	N/A	N/A	53%	54%	55%	56%	15%
Description: The assumption of the performance metrics is that by FY 2020 NOAA's Space Weather Prediction Center will lose their current CME imagery from SOHO and STEREO and that DSCOVR data is no longer available.							

Outyear Funding Estimates (\$ in thousands):

Space Weather FO	FY 2015 & Prior	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	CTC	Total
Change from FY 2016 Base		2,500	-	-	-	-	-	-
Total Request	\$0	2,500	To Be Provided with FY 2017 President's Budget*					

*The formulation of life cycle costs for acquiring solar wind data and CME imagery as the Space Weather Follow On mission will be provided after the AoA is completed and with the FY 2017 President's Budget.

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: NESDIS
Sub-program: Systems Acquisition
Program Change: Space Weather Follow On

Object Class		FY 2016 Increase	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$0
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	0	0
12	Civilian personnel benefits	0	0
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	0
22	Transportation of things	0	0
23.1	Rental payments to GSA	0	0
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and miscellaneous charges	0	0
24	Printing and reproduction	0	0
25.1	Advisory and assistance services	0	0
25.2	Other services	2,500	2,500
25.3	Purchases of goods & services from Gov't accounts	0	0
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	0
31	Equipment	0	0
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	0
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	2,500	2,500

COSMIC-2/Global Navigation Satellite System Radio Occultation (GNSS RO): GNSS RO Ground System: (Base Funding: \$6,800,000 and 1 FTE; Program Change: +\$3,300,000 and 0 FTE): NOAA requests an increase of \$3,300,000 and 0 FTE for a total of \$10,100,000 and 1 FTE for ground reception and processing of GNSS RO satellite data from GNSS RO satellites.

Proposed Actions:

The FY 2016 requested increase of \$3.3 million will be utilized to complete all IT security testing and verification in preparation of the Constellation Observing System for Meteorology, Ionosphere, and Climate (COSMIC-2) launches. Also, all University Corporation for Atmospheric Research (UCAR) processing functions will be tested and certified for operations by National Centers for Environmental Prediction (NCEP) in advance of the FY 2016 and FY 2019 launches. The increase will support the complete operational testing and validation of the Numerical Weather Prediction Models (NWP) for COSMIC-2. This testing requires 8–12 months of joint operations between NCEP and UCAR before the system can be deemed operational at NWS in support of the first COSMIC-2 launch.

There are two COSMIC-2 launches planned for FY 2016 and FY 2019, respectively. The first launch of six satellites is planned for an equatorial low earth orbit (24 degree inclination) and the second is planned to a higher inclination low earth orbit (72 degree inclination). The two different orbits are necessary in order to meet the NOAA signed Level 1 Requirement Document for GNSS RO data, with the main requirements being 45 minute average data latency and over 8,000 soundings for the system per day. The two launches ensure orbital distribution of low earth orbit satellites to provide the appropriate radio occultation (RO) soundings.

The COSMIC-2 mission is an international partnership between NOAA, Taiwan's National Space Organization (NSPO) USAF, and Brazil. COSMIC-2 data will be received at NOAA's Fairbanks ground station and through contracted commercial receiving stations. Data latency is greatly improved for weather applications with each additional ground reception station. The equatorial ground reception system requires a minimum of four ground reception stations, two ground stations on each side of the globe, to achieve the threshold data latency for Numerical Weather Prediction applications. NOAA will issue a competitive solicitation for at least two equatorial ground reception stations, as Taiwan has agreed to supply one ground reception station in their country and other countries such as Brazil may offer similar services for NOAA. NOAA continues investigating the possibility of partnerships with other international and domestic partners to increase the number of ground reception stations to achieve low data latency and high data reliability at low cost.

NOAA also intends to leverage this ground system to acquire other RO data where possible whether from other governmental organizations or commercial operators.

Statement of Need and Economic Benefits:

COSMIC-2 is the follow on to the COSMIC mission. Since its launch in 2006, NOAA has used COSMIC data operationally and has demonstrated an 8+ hour forecast improvement starting at day four in the forecast model. This GNSS RO data helps to eliminate bias for artificial offsets in other observing systems by helping to create consistent measurements from different systems. This advances the overall impact on operational weather models and makes GNSS RO a

calibration anchor for the total observing system. Losing this capability would degrade the performance of the NOAA Numerical Weather Prediction models³.

Resource Assessment:

The resources for this activity are described in the Systems Acquisition narrative.

Schedule and Milestones:

FY 2016–FY 2020:

- Reception and processing of COSMIC-2 data
- Evaluation and improvement of NWS operational quality control algorithms

FY 2016:

- USAF Launches first six satellites
- Reception of equatorial low earth orbit satellite RO data from COSMIC-2 mission and initial validation of data flow

FY 2017:

- Reception of equatorial low earth orbit satellite RO data from COSMIC-2 mission and completion of RO observations from first six
- Initiate antenna refresh at Fairbanks ground station

FY 2018:

- Reception of equatorial low earth orbit satellite RO data from COSMIC-2 mission
- Complete antenna refresh at Fairbanks ground station

FY 2019:

- Launch of second set of satellites
- Reception of polar low earth orbit satellite RO data from COSMIC-2 mission and initial validation of data flow
- Continued processing of polar and equatorial low earth orbit satellite RO data from COSMIC-2

Deliverables:

- Reception and processing of RO data
- Improved quality control algorithms for GNSS RO data in NWS operational data assimilation systems

Performance Goals and Measurement Data:

N/A

³ Based on a study by Cucurull, L., and J.C. Derber, 2008, the documented benefits of COSMIC and other GNSS RO observations on the European Metop satellite include a reduction in total global forecast error of approximately 9 percent.

Outyear Funding Estimates (\$ in thousands):*

GNSS RO Ground System	FY 2015 & Prior	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	CTC	Total**
Change from FY 2016 Base		3,300	1,300	1,300	1,300	1,300		
Total Request	\$8,797	10,100	8,100	8,100	8,100	8,100	23,200	74,497

*Outyears are estimates only. Future requests will be determined through the annual budget process.

**The total cost for the GNSS RO ground system increased to account for an additional year of reception and processing following the projected launch of the second set of six satellites in FY 2019.

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: NESDIS
Sub-program: Systems Acquisition
Program Change: COSMIC 2/GNSS RO

Object Class		FY 2016 Increase	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$137
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	0	137
12	Civilian personnel benefits	0	55
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	25
22	Transportation of things	0	0
23.1	Rental payments to GSA	0	0
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and miscellaneous charges	0	0
24	Printing and reproduction	0	0
25.1	Advisory and assistance services	0	0
25.2	Other services	3,300	9,883
25.3	Purchases of goods & services from Gov't accounts	0	0
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	0
31	Equipment	0	0
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	0
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	3,300	10,100

COSMIC-2/Global Navigation Satellite System Radio Occultation (GNSS RO): COSMIC-2 RO Sensors: (Base Funding: \$0 and 0 FTE; Program Change: +\$9,900,000 and 0 FTE):

NOAA requests an increase of \$9,900,000 and 0 FTE for a total of \$9,900,000 and 0 FTE for the procurement of the second set of six radio occultation (RO) sensors to be launched in FY 2019 for the COSMIC-2 constellation.

Proposed Actions:

The FY 2016 requested increase of \$9.9 million will support the purchase of the second set of six COSMIC-2 RO sensors.

The COSMIC-2 constellation will consist of 12 total RO sensors. The first launch of six satellites in FY 2016, planned for an equatorial low earth orbit (24 degree inclination), is currently in production. The United States Air Force (USAF) is purchasing the first set of RO sensors to be flown on spacecraft procured and operated by Taiwan.

The launch of the second set of six satellites is planned for FY 2019 to an inclination low earth orbit (72 degree inclination). With the requested funding, NOAA will procure the second set of RO sensors for the polar plane. The two different orbits are necessary in order to meet the NOAA signed Level 1 Requirement Document for GNSS RO data, with the main requirements being 45 minute average data latency and over 8,000 soundings for the system per day. Additionally, the acquisition and launch of the second set of six COSMIC-2 sensors will help to mitigate the impacts of a potential gap in polar satellite data on NWS forecasts, products and services.

Statement of Need and Economic Benefits:

COSMIC-2 is the follow on to the COSMIC mission. COSMIC design life was reached in April 2011; one satellite has failed and two satellites are in degraded operation, effectively leaving three of the original six satellites in operation. The COSMIC-2 partnership is a cost-effective means of obtaining global atmospheric temperature profiles, which is currently not available globally from other sources. GNSS RO is a cost-effective means of obtaining global atmospheric temperature profiles, which is currently not available globally from other sources. GNSS RO significantly increases the volume of quality global atmospheric soundings, providing temperature, water vapor, and pressure profiles which will result in more accurate long-range forecasts.

The 12 satellite COSMIC-2 constellation is expected to provide 10 times the number of daily soundings than COSMIC currently provides, which will increase the benefits to weather forecasting. Specifically:

- GNSS RO data provides valuable information on moisture in the tropics, which is important to hurricane track and intensity forecasts. Based on data assimilation research experiments using the current COSMIC data on five 2008 West Pacific typhoons, 48-hour track errors were improved by approximately 11 percent (from 168 nm to 149 nm on average). Increases in forecast performance will affect evacuation and preparedness decisions that directly correlate to saving lives and mitigating the impact of property damage.

In addition to improving forecast accuracy over oceans and regions with few observations, GNSS RO data can reduce the impact of a data gap in polar orbiting observations. GNSS RO data provides unique advantages that can be leveraged to improve data collected from existing NOAA sensors such as the ATMS and CrIS currently operational on S-NPP. COSMIC-2 also

provides ionospheric electron density profiles that do not exist now and will as a result lead to improvements in NOAA's space weather services.

The NWS has determined that the COSMIC mission provides the highest quality and most timely RO data in terms of its non-biased quality, accuracy and depth that the temperature and moisture data can be retrieved. COSMIC data has a significant impact on NOAA's numerical weather predictions and the value of the data, as measured through adjoint studies, remains in the top 5 of all atmospheric observation data collected by space- and air-borne sensors.

Resource Assessment:

The resources for this activity are described in the Systems Acquisition narrative.

Schedule and Milestones:

FY 2016: Initiate procurement of the second set of RO sensors; instrument level integration and testing

FY 2017: Deliver the second set of COSMIC-2 sensors; instrument level integration and testing review

FY 2018: Satellite instrument integration and testing support

FY 2019: On-orbit performance monitoring and mission support; launch second set of satellites

FY 2020: On-orbit performance monitoring and mission support

Deliverables:

- Six RO single instrument suites or instrument systems (The Tri-GNSS Radio Occultation System consists of five major hardware pieces and cabling)

Performance Goals and Measurement Data:

Performance Measure: Percent of COSMIC-2 Sensor milestones completed on time	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	75%	75%	75%	75%	75%
Without Increase	N/A	N/A	0	0	0	0	0
Description: Percentage of annual planned milestones to meet sensor delivery. Milestones include key decision points, major reviews, and testing.							

Outyear Funding Estimates (\$ in thousands):*

GNSS RO/ COSMIC-2: RO Sensors	FY 2015 & Prior*	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	CTC	Total
Change from FY 2016 Base		9,900	8,100	700	700	700		
Total Request	\$0	9,900	8,100	700	700	700	2,200	22,300

* Outyears are estimates only. Future requests will be determined through the annual budget process.

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: NESDIS
Sub-program: Systems Acquisition
Program Change: COSMIC-2 RO Sensors

Object Class		FY 2016 Increase	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$0
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	0	0
12	Civilian personnel benefits	0	0
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	0
22	Transportation of things	0	0
23.1	Rental payments to GSA	0	0
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and miscellaneous charges	0	0
24	Printing and reproduction	0	0
25.1	Advisory and assistance services	0	0
25.2	Other services	9,900	9,900
25.3	Purchases of goods & services from Gov't accounts	0	0
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	0
31	Equipment	0	0
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	0
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	9,900	9,900

Satellite Ground Services (SGS): SGS: (Base Funding: \$55,808,000 and 84 FTE; Program Change: +\$2,717,000 and +0 FTE): NOAA requests an increase of \$2,717,000 and 0 FTE for a total of \$58,525,000 and 84 FTE to continue the planning and transition of the independent ground services into a unified set of common ground services for NOAA's environmental satellite systems.

Proposed Actions:

This funding request will sustain SGS program activities implemented within the FY 2015 Congressional approval of the NOAA reorganization to leverage existing systems to provide new products and services and plan a future set of common ground services for NOAA's satellites. The funding request is needed to accelerate prototyping of software elements that can be used by multiple applications and to evaluate hardware options for technology refresh action. These activities are a critical step toward setting the foundation for an enterprise ground system that will ultimately generate cost savings and interface efficiencies across NOAA.

The specific activities to be performed with FY 2016 funds include

- Continue to implement capabilities to process satellite observations into useful products that meet the requirements of NOAA's operational centers and other external users;
- Sustain the current and legacy ground systems in use at NESDIS facilities, including GOES and POES capabilities;
- Continue the development of the NPOESS Data Exploitation (NDE) capability, started in 2011, that produces products from the Suomi National Polar-orbiting Partnership (S-NPP) satellite;
- Establish the foundation for sustaining upcoming satellite systems in NOAA, including the Joint Polar Satellite System (JPSS) satellites and the Geostationary Operational Environmental Satellite R-Series Program (GOES-R); and
- Plan the transition of the next generation of polar and geostationary satellite programs into the common ground services.

Statement of Need and Economic Benefits:

NOAA provides satellite operations, data collection, data processing, distribution, and archive for multiple satellites and will be adding new satellites (such as JPSS-1, GOES-R) in the future. Many of the ground systems (GS) (or ground system components) were developed and are operated specifically for each mission or mission set. The GS variations are usually driven by the latest technology at the time of the GS development rather than differences in mission requirements. As a result of the GS technology differences, the staffing for operations and maintenance of each mission is unique with little cross-staffing.

The goal of the SGS program is to develop a common design and architectural features that are implemented across the Enterprise Ground System to allow for cost savings by reducing staff redundancies, increasing uniformity of infrastructure among sites and developing common ground services in areas such as command and control, product processing, product generation, and product distribution. These activities will consolidate functions and interfaces to reduce costs while improving cybersecurity, communications, and data archiving capabilities

Resource Assessment:

Current resources are described in the Systems Acquisition narrative.

Schedule and Milestones:

FY 2016 – FY 2020:

- Migrate legacy data distribution to centralized common distribution services
- Define a common algorithm product generation platform; and centralize, where possible, product generation services

FY 2016:

- Complete NDE Production Environment upgrades for JPSS-1 launch
- Complete Ground system upgrades for support of MetOp-C

FY 2017:

- Evaluate new Production Environment using JPSS-1 data
- Complete refresh of GOES Enterprise Management System (GEMS)

FY 2018:

- Integrate first set of JPSS-1 products into new Production Environment
- Complete refresh of Data Collection System (DCS) Acquisition & Data Distribution System (DADDS)

FY 2019: Complete refresh of the Integrated Mission Monitoring System (IMMS), Spacecraft Support Ground System (SSGS), and Satellite Information Management System (SIMS)

Deliverables:

- Level 1 and 2 requirements document for satellite common ground services
- Quality Management System documents
- Defined requirements and a proof of concept for Homeland Security Presidential Directive-12 solution for mission programs
- Active risk management via end-to-end ground system readiness management process
- Continued operational sustainment of the GOES ground systems
- Continued operational sustainment of the POES ground systems, including Jason-2 and -3 and MetOp-A, -B, -C
- Long-term, safe storage that meets the NOAA Data Centers' legislative requirements

Performance Goals and Measurement Data:

Performance Measure	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
Measure 1: CLASS Development System components integrated into the Data Centers' operational architecture (CLASS Operations System) ready to support NEW Satellite Launches/RADAR DP and PH Upgrades, Model Data, etc. (Cum # systems the CLASS Ops System is ready to support)	N/A	N/A	11 GOES-R	12 JPSS-1	12	12	12
Measure 2: Number of environmental observational parameters transitioned from NDE development to test.	N/A	N/A	0	10	8	0	0
Description: Measure 1 measures the cumulative number of systems ready to be supported by the CLASS Ops System. Measure 2 measures the number of environmental observational parameters (EOPs) transitioned from NDE development to test environments. Additional performance measures will be developed following completion of to-be architecture planning.							

Outyear Funding Estimates* (\$ in thousands):

Satellite Ground Services	FY 2015 & Prior	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	CTC	Total
Change from FY 2016 Base	-	2,717	2,717	2,717	2,717	2,717	N/A	
Total Request*	55,808	58,525	58,525	58,525	58,525	58,525	N/A	Recurring

*Outyears are estimates only. Future requests will be determined through the annual budget process.

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: NESDIS
Sub-program: Systems Acquisition
Program Change: Satellite Ground Services

Object Class		FY 2016 Increase	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$11,119
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	0	11,119
12	Civilian personnel benefits	0	4,324
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	170
22	Transportation of things	0	25
23.1	Rental payments to GSA	0	500
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and miscellaneous charges	0	200
24	Printing and reproduction	0	25
25.1	Advisory and assistance services	0	15,000
25.2	Other services	0	0
25.3	Purchases of goods & services from Gov't accounts	0	0
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	2,717	27,127
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	10
31	Equipment	0	25
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	0
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	2,717	58,525

System Architecture and Advanced Planning (SAAP): SAAP: (Base Funding: \$3,342,000 and 14 FTE; Program Change: +\$1,587,000 and +0 FTE): NOAA requests an increase of \$1,587,000 and 0 FTE for a total of \$4,929,000 and 14 FTE to establish and lead the system engineering processes necessary to meet NESDIS' mission assurance needs.

Proposed Actions:

The funding increase is needed to provide adequate end-to-end validation of the GOES-R and JPSS-1 mission requirements to ensure the NESDIS' systems and products meet the operational needs identified by the user community. Fulfilling enterprise-level end-to-end validation has been a key focus of the NESDIS System Review Boards for NOAA's satellite missions, including GOES-R and JPSS. Funding this activity in FY 2016 is critical for GOES-R to complete development activities and to certify end-to-end validation of the GOES-R products and ground system prior to launch.. Remaining funding will be used to support planning for the full development of next generation satellite and ground architectures. NESDIS architecture planning is integral to the long-term continuity of satellite products used for environmental monitoring and prediction at an affordable cost.

Statement of Need and Economic Benefits:

SAAP applies systems engineering principles to balance the demands of high technical quality and to meet cost and schedule requirements across NESDIS to ensure and enable the success of its mission, vision, and objectives. Its core responsibilities include enterprise-level system architecture, advanced system and technology planning, management and technical policies and procedures, and system validation, assurance, and adjudication to ensure that comprehensive solutions meet mission objectives. SAAP performs systems engineering design, analysis, and evaluation of space flight, ground, data, and archive segments. As part of this responsibility, the program defines policies and procedures for systems engineering related to acquisitions, operations, archiving, and sustainment for implementation throughout NESDIS. The program establishes and administers the quality management system across NESDIS by identifying best practices and providing overall systems assurance and configuration management to ensure compliance to the NESDIS quality management system through the life cycle of each NESDIS enterprise. In addition to performing top-level requirements definition, traceability, and final validation and verification, SAAP serves as principal advocate for ensuring and enabling the success and mitigating risk of the NESDIS enterprise to meet its mission, vision, and objectives through systems analysis of current and future enterprise architectures. SAAP provides the resource capacity to perform system engineering trades needed for balancing risk and performance against full life cycle development, operations, and maintenance costs. SAAP will provide the linchpin services needed for achieving an optimal satellite architecture that ensures the long-term continuity of satellite products used for environmental monitoring and prediction at an affordable cost.

Resource Assessment:

Current resources are described in the Systems Acquisition narrative.

Schedule and Milestones:

FY 2016-FY 2020:

- Continue provision of enterprise systems engineering enterprise oversight/insight of end-to-end NESDIS program development
- Provide systems architecture, systems engineering and advanced planning services for the design, development, and implementation of enterprise ground system implementation

FY 2016: Support the launch and end-to-end mission validation of GOES-R systems and products

FY 2017: Support the launch and end-to-end mission validation of GOES-S and JPSS-1 systems and products

FY 2019: Support the launch and end-to-end mission validation of GOES-T systems and products

Deliverables:

- Level 0 and 1 requirements document for enterprise ground services and archive
- Enhanced NESDIS architectures and implementation roadmap
- NESDIS quality management system, including configuration control of enterprise technical reference model (TRM) and engineering standards
- Active enterprise risk management
- End-to-end mission validation report and lessons learned

Performance Goals and Measurement Data:

Performance Measure: Systems engineering milestones completed on time	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	100%	100%	100%	100%	100%
Without Increase	N/A	N/A	75%	75%	75%	75%	75%
Description: This measure includes the on-time completion of all systems engineering initiatives as specified in schedules/milestones with deliverables noted. The oversight and insight will enable and aid the enterprise in developing follow-on strategies. FY 2016-2020 initiatives are estimates and will be refined from the 2015 activities and supporting contributions to the satellite series development.							

Outyear Funding Estimates* (\$ in thousands):

SAAP	FY 2015 & Prior	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	CTC	Total
Change from FY 2016 Base		1,587	1,587	1,587	1,587	1,587	N/A	
Total Request	3,000	4,929	4,929	4,929	4,929	4,929	N/A	Recurring

*Outyears are estimates only. Future requests will be determined through the annual budget process.

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: NESDIS
Sub-program: Systems Acquisition
Program Change: System Architecture and Advanced Planning (SAAP)

Object Class		FY 2016 Increase	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$1,734
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	0	1,734
12	Civilian personnel benefits	0	520
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	40
22	Transportation of things	0	0
23.1	Rental payments to GSA	0	216
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and miscellaneous charges	0	10
24	Printing and reproduction	0	0
25.1	Advisory and assistance services	0	0
25.2	Other services	0	0
25.3	Purchases of goods & services from Gov't accounts	1,587	2,397
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	2
31	Equipment	0	10
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	0
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	1,587	4,929

Projects, Planning and Analysis (PPA): PPA: (Base Funding: \$25,200,000 and 36 FTE; Program Change: +\$5,288,000 and 0 FTE): NOAA requests an increase of \$5,288,000 and 0 FTE for a total of \$30,488,000 and 36 FTE to prepare three critical NOAA instruments for launch on the European satellite called MetOp-C. PPA is responsible for the project management and integration lead for data exploitation of NOAA's satellites while providing on-orbit anomaly support and sustainment for existing operational systems.

Proposed Actions:

This funding request will allow NOAA to recalibrate the Space Environment Monitor (SEM) instrument on schedule to be shipped to Europe for satellite Dynamics and Electro-Magnetic Compatibility Testing. Without this funding request, NOAA will be unable to meet schedule obligation to ensure SEM's accommodation on MetOp-C in Q1 FY 2019.

Statement of Need and Economic Benefits:

In response to continuing pressure to reduce the cost of NOAA's observing systems, PPA provides core infrastructure support to enable infusion of low-cost and high-performance alternatives into NOAA's operational space systems. In collaboration with NASA research organizations (and others), PPA surveys, evaluates, and encourages ongoing developments of particular relevance to NOAA's satellites. Without the technology maturation and infusion efforts of PPA, NOAA will continue to rely on legacy high-cost technology and be ill-prepared to accelerate introduction of lower-cost and higher performance capabilities.

PPA administers a comprehensive requirements identification and analysis process and translates requirements for data, products, and services into flight projects and partnerships. It establishes partnership-based flight project system objectives, as well as performance, engineering, and cost criteria. PPA also develops interface standards and uses technical and engineering consultation for system capability, development, implementation, and deployment to serve the environmental remote-sensing satellite user community as well as system performance specifications by current or future satellite systems. PPA performs end-to-end system design studies for flight projects and partnerships and integrates NESDIS's space and ground concept of operations as applicable.

PPA provides the integration of science planning and operational science product development to be completed by the missions. These are the real-time products that serve NOAA's National Weather Service and National Ocean Service and fulfill international agreements. Given the critical importance of this data to the U.S. government, PPA has to ensure each system and asset identified within its portfolio is fully ready and capable of operating as intended. This is the mission assurance role that PPA provides for our portfolio of leveraged missions.

PPA also contains the Technology, Planning, and Integration for Observations (TPIO) Office, which is responsible for validating NOAA observation analysis and requirements, conducting observing system impact and portfolio analyses, and coordinating NOAA's data management activities. At the Federal level, TPIO supports the President's OSTP directly by conducting the triennial Earth Observing Assessment. This assessment focuses on key products, observing system inputs and impacts across the U.S. government in support of 13 Societal Benefit Areas (SBA). It is a direct input into the National Plan on Civil Earth Observation, a supplement to the President's Budget.

PPA's portfolio is efficient in that it is able to verify observational requirements, validate the feasibility of alternative approaches, and leverage unique opportunities and partnerships to

provide the data at a reduced cost to the taxpayer. This role is unique within NOAA and is not duplicated by NASA.

Resource Assessment:

Current resources are described in the Systems Acquisition narrative.

Schedule and Milestones:

FY 2016:

- Interim release of NOAA Satellite Technology Roadmap; calibrate the Space Environment Monitor and ship to Europe
- Prepare to support launch of MetOp-C

FY 2017: Evaluate U.S. instrument performance during MetOp-C Thermal Vacuum Test in Europe

FY 2018:

- Monitor U.S. instrument performance during MetOp-C dynamics and electro-magnetic compatibility testing in Europe
- Support MetOp-C pre-ship review
- Conduct NOAA component of triennial Office of Science and Technology Policy-led, USG-Wide, and Earth Observing System Assessment

FY 2019: MetOp-C launch in Kourou and post-launch evaluation of U.S. instruments

FY 2020: Assist NESDIS OSPO by providing engineering services to support on-orbit anomalies of U.S. instruments on MetOp and all anomalies on POES satellites

Deliverables:

- Engineering support for the on-orbit POES satellites and support to EUMETSAT for U.S. instruments for MetOp satellites, either in orbit or waiting to be launched
- Continued on-orbit anomaly support for GOES satellite on-orbit assets
- Continued analysis, identification, and validation of NOAA's comprehensive environmental observation requirements
- Improvements to NOAA's Environmental Data Management (EDM) policy and practices via NOAA Data Catalog, EDM Dashboard, annual EDM Workshops, liaison with U.S. and international groups (data.gov, USGEO, GEOSS, WMO), and agency membership in Open Geospatial Consortium, Earth Science Information Partners, and EZID/DataCite
- Annual updates to the broad satellite technology survey and NESDIS Roadmap
- Annual identification of pathways for disruptive upgrades to NOAA space systems
- Management and administration of GOES and POES flight projects, MetOp, DSCOVR, Jason-3, COSMIC-2, SIDAR, and future follow-on missions

Performance Goals and Measurement Data:

Performance Measure: Percent of MetOp-C milestones completed on time	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	75%	75%	75%	75%	75%
Without Increase	N/A	N/A	75%	25%	0%	0%	0%
Description: Percentage of projected annual program oversight and technical management milestones completed each year to meet the launch readiness date for MetOp-C. This includes key decision points, major reviews, testing, and delivery of the instruments.							

Outyear Funding Estimates* (\$ in thousands):

PPA	FY 2015 & Prior	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	CTC	Total
Change from FY 2016 Base	-	5,288	8,288	8,288	8,288	8,288	N/A	
Total Request*	\$25,200	30,488	33,488	33,488	33,488	33,488	N/A	Recurring

*Outyears are estimates only. Future requests will be determined through the annual budget process.

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: NESDIS
Sub-program: Systems Acquisition
Program Change: PPA

Object Class		FY 2016 Increase	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$4,003
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	24
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	<hr/> 0	4,027
12	Civilian personnel benefits	0	1,169
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	295
22	Transportation of things	0	0
23.1	Rental payments to GSA	0	671
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and miscellaneous charges	0	60
24	Printing and reproduction	0	0
25.1	Advisory and assistance services	0	0
25.2	Other services	0	13,206
25.3	Purchases of goods & services from Gov't accounts	5,288	10,418
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	42
31	Equipment	0	73
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	527
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	<hr/> 5,288	30,488

APPROPRIATION ACCOUNT: PROCUREMENT, ACQUISITION, AND CONSTRUCTION
SUB-PROGRAM: NESDIS CONSTRUCTION

SATELLITE COMMAND AND DATA ACQUISITION (CDA) FACILITY

The Satellite CDA Facilities Program ensures that power and cooling infrastructure is available 99.99 percent of the year, supporting the continuous collection, processing, and distribution of environmental data for the issuance of life saving NWS watches and short-term warnings to the public. This program supports the operation of critical infrastructure at the Wallops, VA, and Fairbanks, AK, Command and Data Acquisitions (CDA) stations, the NOAA Satellite Operations Facility (NSOF) in Suitland, MD, and the NESDIS Consolidated Backup (CBU) in Fairmont, WV. The NSOF and the CDA facilities have been determined to house National Critical Infrastructure elements by Presidential Decision Directive.

The Wallops and Fairbanks CDA facilities continue to undergo significant infrastructure and building upgrades to replace aging equipment. The program is updating major electrical, mechanical, and control systems that are operating well past their design lives, based on a Facilities Master Planning Process that began for the stations in 1998. Both facilities require annual repair and replacement of aging infrastructure components to ensure the high level of reliability and redundancy necessary to protect the health and safety of the satellites and satellite ground system.

The NSOF facilities infrastructure is a complex system designed to ensure that power and cooling are available for NOAA's satellite operations without fail and can be maintained and repaired without having an impact on satellite missions. The complexity of the infrastructure demands the highest level of repair, replacement, and rehabilitation to ensure that facility support is provided to the multiple satellite missions operating at this location.

The NESDIS CBU facility's primary function will be to support contingency operations and perform all of the critical functions of NSOF and Wallops CDA station. The facility will consist of key complementary ground systems that will support contingency operations and perform all of the vital functions necessary for operating the satellites and producing and distributing critical environmental satellite data in the event of a catastrophic failure at the primary facilities. In addition, the CBU will also serve as a backup during system or equipment testing and/or maintenance.

Schedule and Milestones:

FY 2016-2020:

- Complete design and begin rehabilitation of the Wallops facility Operations Building infrastructure
- At the CDAS, NSOF, and CBU Facilities, replace UPS batteries and capacitors
- At all satellite facilities, refresh equipment to maintain physical security controls required to protect IT High Impact mission system in accordance with Federal standards
- At NSOF, add redundant cooling in critical Communication Rooms to ensure hardware supporting operational data inflow and distribution is maintained 24 hours a day, 7 days a week

Deliverables:

- This program will complete the Electrical Distribution System upgrades at the Wallops facility, providing a modernized, robust, and reliable Electrical Distribution System with increased capacity to meet current and future mission requirements.

Performance Goals and Measurement Data:

Performance Measure: Percentage of Power and Cooling Uptime	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	99.5%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%
Description: Maintain power and cooling for mission systems in order to maintain around-the-clock satellite operations, data processing, and distribution 99.99% of the time.							

Outyear Funding Estimates* (\$ in thousands):

Satellite CDA	FY 2015 & Prior	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	CTC	Total
Change from FY 2016 Base		62	62	284	0	0	0	
Total Request	\$23,732	2,228	2,228	2,450	0	0	0	30,638

*Outyears are estimates only. Future requests will be determined through the annual budget process.

PROGRAM CHANGES FOR FY 2016:

Satellite Command and Data Acquisition (CDA) Facility: (Base Funding: \$2,166,000 and 0 FTE; Program Change: +\$62,000 and 0 FTE): NOAA requests an increase of \$62,000 and 0 FTE for a total of \$2,228,000 and 0 FTE.

The following exhibit shows the summary object class detail for the Satellite CDA Facility program change increase of \$62,000.

**PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)**

Budget Program: NESDIS
Sub-program: Construction
Program Change: Satellite CDA Facility

Object Class		FY 2016 Increase	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$0
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	<hr/> 0	0
12	Civilian personnel benefits	0	0
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	0
22	Transportation of things	0	0
23.1	Rental payments to GSA	0	0
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and miscellaneous charges	0	0
24	Printing and reproduction	0	0
25.1	Advisory and assistance services	0	0
25.2	Other services	0	0
25.3	Purchases of goods & services from Gov't accounts	62	2,228
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	0
31	Equipment	0	0
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	0
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	<hr/> 62	2,228

BUDGET PROGRAM: NOAA PROGRAM SUPPORT

For FY 2016, NOAA requests a total of \$277,004,000 and 898 FTE for Program Support, including a net decrease of \$3,859,000 in program changes and an increase of 11 FTE.

Program Support Overview

The Program Support Operations, Research, and Facilities (ORF) account (\$280,863,000 and 887 FTE) includes three sub-programs.

- Corporate Services (\$230,165,000 and 819 FTE) includes the Under Secretary and Associate Offices, NOAA Wide Corporate Services and Agency Management, and IT Security
- Office of Education, previously named the NOAA Education Program, (\$27,631,000 and 23 FTE)
- Facilities (\$23,067,000 and 45 FTE) includes NOAA's ongoing facilities management and maintenance activities

NOAA's Program Support provides the planning, administrative, financial, procurement, information technology, human resources, and infrastructure services that are essential to the safe and successful performance of NOAA's mission.

Within the Corporate Services sub-program, there are three line items: 1) NOAA's Under Secretary and Associate Offices; 2) NOAA Wide Corporate Services and Agency Management; and 3) IT Security. The Under Secretary and Associate Offices budget line item funds centralized executive management as well as policy formulation and direction. In addition, there are various staff offices, including the Offices of the Under Secretary/Assistant Secretary and Deputy Under Secretary; Legislative and Intergovernmental Affairs; Communications and External Affairs; International Affairs; the Federal Coordinator for Meteorology; and the General Counsel. The NOAA Wide Corporate Services and Agency Management budget line item funds such activities as financial reporting, budgeting, information technology, acquisitions and grants, and human resource services. The IT Security budget line item funds priority cyber security initiatives.

The Office of Education (OEd) provides expert support of education activities to NOAA Line, Program, and Staff Offices, while promoting NOAA services and products, and their benefits to the public. The OEd identifies opportunities for the deployment of coordinated interagency/intergovernmental policy strategies that recognize the importance of linking education, economic, and environmental goals. The OEd also manages Competitive Education Grants, Education Partnership Program with Minority Serving Institutions (EPP/MSI), and the Ernest F. Hollings Scholarship Program, which is funded through a legislatively mandated set-aside of one-tenth of one percent of NOAA's annual appropriation.

The Facilities sub-program provides funds to maintain corporate campuses, and monitor environmental compliance and safety activities NOAA-wide. NOAA focuses on compliance with Executive Order 13327 (Federal Real Property Asset Management) with a goal to conduct required maintenance and periodic lifecycle replacement of major building systems and components in order to maintain facilities on corporate campuses at a safe and effective operational state. Funds for new construction and selected major facility projects are requested separately in the Procurement, Acquisition, and Construction account.

Significant Inflationary Adjustments:

NOAA's FY 2016 Base includes an increase of \$32,963,000 and 0FTE to account for the full funding requirement for inflationary adjustments to current programs for Program Support activities. This includes the estimated 2016 Federal pay raise of 1.3 percent as well as inflationary increases for non-labor activities, including service contracts, utilities, field office lease payments, and rent charges from the General Services Administration (GSA).

NOAA also requests the following transfer for a net change of \$0 and 0 FTE to the agency:

From Office	PPA	To Office	PPA	Amount/FTE
PS	NOAA Wide Corporate Services and Agency Management Base	OAR	Weather and Air Chemistry – Laboratories & Cooperative Institutes	\$684,000/9FTE
PS	BWET Regional Programs	PS	Office of Education	\$0/1 FTE
PS	Educational Partnership Program/Minority Serving Institutions	PS	Office of Education	\$14,400,000/11 FTE

NOAA requests to transfer of \$684,000 and 9 FTE to move the funding and functions of the Information Resource Branch (IRB) (Boulder Labs Library) from the CIO to OAR. This transfer will streamline management of the IRB by co-locating management with the facility and the customers it serves.

NOAA requests a technical adjustment of \$14,400,000 and 11 FTE from the Educational Partnership Program with Minority Serving Institutions (EPP/MSI) PPA and \$0 and 1 FTE from the BWET Regional Programs PPA to the Office of Education PPA, for a net change to NOAA of \$0 and 0 FTE. These adjustments will improve the ability of the Office of Education to manage EPP/MSI and sustain office activities.

Headquarters Administrative Costs:

In FY 2016, Program Support Staff and Corporate Offices will use \$174,000,000 to support general management activities, financial management and budgeting, and IT-related expenses, as well as supporting facilities and other general operating costs. These funds also include support for service contracts, utilities, and rent charges from GSA. Specifically, Program Support will use headquarters administrative funds to support the following:

Headquarters Program Support Type	Description	FY 2016 Amount	FY 2016 FTE associated with PS HQ
General Management & Direction/Executive Management	Includes Under Secretary's office, public affairs, information services	\$31,924,000	163
Budget & Finance	Includes Budget, Finance, and Accounting	\$38,470,000	207
Facilities/Other Administrative Functions (CAO Functions)	Includes Facilities and Security costs, as well as other CAO related activities	\$45,593,000	178
Human Resources	All HR services, including EEO	\$18,160,000	130
Acquisitions and Grants		\$13,681,000	105
Information Technology	Includes IT-related expenses and other CIO-related activities	\$26,172,000	111
Total		\$174,000,000	894

APPROPRIATION ACCOUNT: OPERATIONS, RESEARCH, AND FACILITIES
SUB-PROGRAM: CORPORATE SERVICES

The objectives of the Corporate Services sub-program are to

- Develop policies regarding the administration of NOAA programs with Federal agencies, the Congress, and private industry;
- Provide oversight of the implementation of information technology policies; and
- Develop and implement policy, planning, and program oversight.

NOAA conducts activities in several program areas within the Under Secretary and Associate Offices and NOAA Wide Corporate Services and Agency Management to achieve these objectives. These activities are composed of three primary programs:

1. NOAA's Under Secretary and Associate Offices (USAO)

USAO supports the leadership and management of NOAA, and represents NOAA at the executive level with other Federal agencies, Congress, NOAA stakeholders, and private industry.

Offices of the Under Secretary/Assistant Secretary and Deputy Under Secretary:

These offices support NOAA's leadership. Program activities consist of formulating and executing policies for achieving NOAA objectives, responding to Executive Branch policy decisions, and exercising delegated authority in committing NOAA to courses of action. USAO also consists of the following additional Staff Offices covering specific areas of activities:

Office of Legislative and Intergovernmental Affairs (OLIA): This office is responsible for devising and implementing the legislative strategy to carry out NOAA's initiatives requiring Congressional action. OLIA articulates the views of NOAA, including its components, on Congressional legislative initiatives. OLIA responds to requests and inquiries from Congressional committees, individual congressional members, and their staff. It coordinates Congressional oversight activities involving NOAA, as well as the appearances of NOAA's witnesses and the interagency clearance of all Congressional testimony. OLIA serves as the primary liaison for NOAA with the members and staff of Congress. The office is also responsible for the planning, direction, and coordination of legislative programs that are of immediate concern to the Office of the Under Secretary.

Office of Communications and External Affairs: This office is the principal point of contact for NOAA programs with the public and the news media. Its staff advises NOAA and other Departmental officials on all aspects of media relations and communication issues. The Office ensures that information provided to the news media by NOAA is current, complete, and accurate. It also ensures that all applicable laws, regulations, and policies involving the release of information to the public are followed so that maximum disclosure is made without jeopardizing investigations and prosecutions, violating rights of individuals, or compromising national security. Activities address a variety of unique audiences: media; non-government organizations; state, tribal, territorial, regional, and local government; and the general public.

Office of International Affairs (OIA): This office coordinates NOAA and other leadership officials' relationships with international programs, as directed by the Office of the Under Secretary. The Director of the Office of International Affairs exercises a leadership role in

establishing policies, guidelines, and procedures for NOAA's international programs. Within DOC, NOAA OIA works closely with the International Trade Administration on a broad spectrum of issues including seafood exports, export control issues, and information exchange on countries and regions. Outside of DOC, NOAA OIA works closely with the State Department, the U.S. Agency for International Development, and others, to represent U.S. interests abroad in NOAA mission areas.

Office of the Federal Coordinator for Meteorology (OFCM): This office establishes procedures for systematic and continuing review of national basic and specialized meteorological and oceanographic requirements for services and supporting research. It also brings Federal agencies concerned with international activities and programs in meteorological and oceanographic programs into close consultation and coordination.

Office of General Counsel (OGC): NOAA's Office of General Counsel provides legal advice, review, and representation on a host of complex matters arising from the fulfillment of NOAA's mission to understand and predict changes in Earth's environment and conserve and manage coastal and marine resources to meet the Nation's economic, social, and environmental needs. In doing so, NOAA OGC ensures NOAA management decisions are made with necessary consideration of proper legal requirements, procedures, and options.

2. NOAA Wide Corporate Services and Agency Management

Acquisition and Grants Office (AGO): The mission of AGO is to provide responsive, timely, and fully-compliant acquisition and financial assistance services at the best value to the government. With overhead at approximately one percent of obligated dollars, AGO provides high-value services to NOAA Line and Staff Offices through the planning, solicitation, award, administration, and closeout of approximately 16,000 acquisition and financial assistance transactions annually. NOAA's ability to accomplish its mission and achieve its goals depends significantly on AGO's ability to obligate over \$3 billion annually in accordance with statutory and regulatory requirements. In FY 2014 for example, \$1.345 billion was obligated via 11,875 acquisition transactions, \$896 million was obligated via 4,053 financial assistance transactions, and \$1.02 billion was transferred to other Federal agencies (primarily the National Aeronautics and Space Administration). Of those transactions, approximately 300 acquisition actions and 170 grant awards were of high societal impact and involved major systems or high risk programs. Through such efforts, AGO helps NOAA execute its day-to-day responsibilities and assists the agency in providing critical services to the Nation.

Office of Chief Administrative Officer (OCAO): The OCAO is responsible for oversight of NOAA's facility management program (including policy development, guidance, and capital investment planning for NOAA's substantial facility portfolio totaling over \$5 billion in owned and leased facilities); corporate campus facility construction, repair, modernization, and operations; and real and personal property management. The facility management program supports NOAA's mission by providing program direction and oversight to NOAA to ensure NOAA's facilities support current and future mission requirements. The OCAO ensures continued NOAA-wide compliance with Export Administration Regulations and oversees NOAA's Office of Inspector General and Government Accountability Office audit coordination and resolution program. The OCAO also manages the mail operations, administrative issuances program, civil rights program, and compliance with Homeland Security Presidential Directive (HSPD-12) requirements.

Office of the Chief Financial Officer (CFO): The CFO serves as NOAA's principal financial manager. NOAA has annual appropriated resources of nearly \$6 billion and recorded capital asset value in excess of \$7 billion. The CFO also has the responsibility under the CFO Act to provide the leadership necessary for NOAA to obtain an annual 'unqualified opinion' on the audit of its consolidated financial statements. The areas under the direction of the CFO are the Budget Office, the Finance Office, the Commerce Business System (CBS), and Common Services (CS).

The Budget Office (BO) is responsible for the oversight and management of NOAA's budget process. It develops overall guidance, reviews proposals, and prepares supporting justification and documentation. This includes coordinating the preparation of NOAA budget submissions to DOC, OMB, and Congress, including data on budget authority, obligations, outlays, permanent positions, and full-time equivalent employment. The Budget Office also allocates and controls the execution of all budgetary resources as required under the Congressional Budget and Impoundment Act of 1974 (2 U.S.C. 601-688) and related statutes, and as specified by OMB. Finally, it coordinates outreach and communication related to the budget process, particularly with the staff of Congressional Appropriations committees, as well as other Executive Branch agencies.

The Finance Office works to ensure that NOAA's consolidated financial statements and reports accurately reflect NOAA's fiduciary status at the end of the fiscal year, as required of all government agencies under the CFO Act of 1990. It operates NOAA's financial management system, CBS, to ensure that NOAA managers have access to timely financial data necessary to make informed programmatic decisions. The Finance Office is also responsible for ensuring that NOAA's bills are paid in a timely manner. In addition, the Finance Office

- plans, designs, and coordinates financial operations standards and practices, providing financial management services and support to NOAA programs; and
- prepares internal and external accounting and financial reports on NOAA appropriations, including audited financial statements required by the CFO Act.

DOC Accounting System (CBS) supports the NOAA CFO in ensuring compliance with legal, regulatory, and executive requirements and enables NOAA program managers to execute the budget while enforcing funds control. The CBS application (along with associated interfaces and feeder systems) requires maintenance and enhancements that need to be tested to ensure that integrity, availability, and confidentiality are maintained within the context of a secure application environment. The CBS user community (which consists of over 10,000 users across the agency) requires ongoing help desk services and training. Ongoing maintenance and support of CBS allows NOAA to maintain compliance with OMB Circular A-123 and the Federal Information Security Management Act.

NOAA develops CBS application interfaces, maintains the NOAA Data Warehouse and portal (including associated feeder systems), and conducts quality assurance tests to ensure that the CBS application and all associated feeder systems produce reliable, accurate, and verifiable data. This helps to ensure NOAA compliance with legal, regulatory, and executive requirements and allows NOAA managers to have access to the financial data necessary to make informed programmatic decisions and perform funds management

The Common Services (CS) account supports the NOAA CFO in providing resources for NOAA-wide activities and services provided through the Department of Commerce (DOC) and other agencies through Memoranda of Understanding and/or Interagency Agreements. CS funds the Departmental Management Advances and Reimbursements accounts providing a centralized funding source for special services and tasks provided by DOC; off-site health services at the Census Bureau Health Unit; Office of Personnel Management USAJobs portal usage and maintenance; and other miscellaneous services and products.

Office of the Chief Information Officer (OCIO): NOAA OCIO is organized on an operating model focused on service delivery, customer support, innovation, and security with a mission to provide a secure and agile information enterprise with advanced computing capability that propels NOAA's scientific and operational missions. The cornerstone of the operating model is delivering shared enterprise information services through technology advancements including cloud computing, mobile devices, big data, and grid computing. This allows OCIO to provide information ingestion, processing, and dissemination capabilities to NOAA at greater scales. NOAA OCIO has established four organizational goals to be achieved in FY 2015 and beyond: 1) deliver world-class information services to end users, enabling innovation, improving science, and providing greater customer satisfaction; 2) improve the efficiency of delivering information services across bureau operations and management by employing agile and innovative methodologies, processes, and tools; 3) provide worldwide, secure access to data, information, and systems and continuously protect these assets from loss or unauthorized access, and; 4) enable and equip a high-performance information services workforce that is highly motivated, customer-service oriented, diverse, and focused on transformative goals.

Workforce Management Office (WFMO): WFMO provides policies, programs, and processes that facilitate the recruitment, hiring, development, and retention of a diverse, highly-skilled, motivated, and effective workforce capable of accomplishing the Agency's mission. This office provides NOAA-wide leadership workforce management functions including strategic human capital planning, labor-management and employee relations, performance management and incentive awards, executive resources, distance learning, leadership development, training and career development, as well as human resources data management and automation initiatives.

Program Planning and Integration (PPI): PPI fosters integration and strategic management among NOAA Line Offices, Staff Offices, and councils. PPI ensures that agency investments and actions are guided by the NOAA strategic plan; are based on sound social and economic analysis; adhere to executive and legislative science, technology, and environmental policy; respond to regionally-specific stakeholder needs; and integrate the full breadth of NOAA's resources, knowledge, and talent to meet its stated mission goal.

PPI has several facets that work together to corporately assist the development and execution of NOAA's strategy to achieve NOAA's goals. PPI leads NOAA's system for Strategy, Execution, and Evaluation (SEE) in order to align strategic priorities to the budget and provide meaningful evaluation of budget execution. In addition, PPI coordinates NOAA's internal and external collaborative networks by promoting coordination of NOAA's diverse assets within eight regions and communicates social science benefits of NOAA's programs.

Payment to the DOC Working Capital Fund (WCF): The DOC WCF provides centralized services to NOAA’s Line Offices and Staff Offices in the most efficient and economical manner. Organizational units within DOC provide the administrative, legal, information technology, and financial policy support needed to accomplish NOAA’s mission. The DOC WCF was established pursuant to 5 USC 607 (15 USC 1521). The NOAA contribution to the DOC WCF is provided by specific allocation within the NOAA appropriation.

3. IT Security

Federal cyber security priority areas include Trusted Internet Connection (TIC) capability and use, continuous monitoring of Federal information systems, and strong authentication using government-issued identity credentials. NOAA’s cyber security efforts include routing external network traffic through established Trusted Internet Connection Access Providers (TICAPs), providing continuous monitoring across the enterprise, and adopting the DoD Common Access Card (CAC) to ensure only authorized employees have access to Federal information systems.

Schedule and Deliverables:

CFO Schedule and Deliverables:

Description of Milestone	Planned Completion Date
Provide Enacted Fund Availability Table	Q1 Annually
Complete apportionment submission to DOC	10 days after enactment, annually
Provide funding allocations to NOAA Line Offices	15 days after enactment, annually
Identify corrective action plans for Audit Findings	1-30 days after receipt of Final Findings, annually
Review Execution spend plan for Staff Offices	Monthly
Complete Direct Bill analysis and distribution of Direct Bill Funds	Q2 Annually
Complete Blue Book for President's Budget Request	Q2 Annually
Document and track all Congressional Appropriation Reports	Monthly
Complete Congressional Budget Submission	Q2 Annually

OCIO Schedule and Deliverables:

Activity	Description of Milestone	Planned Completion
Portfolio Management	Prepare IT Implementation Plan	Q1 Annually
	Prepare NOAA Operational IT Plan	Q2 Annually
	Prepare NOAA Strategic IT Plan	Q3 Annually
	Maintain and/or improve the overall ratings of NOAA Major Investments on the Federal IT Dashboard	Quarterly
Cyber Security	Complete Risk Management Framework and Continuous Monitoring packages in accordance with the CIO Council-approved schedule	Quarterly
	Complete Contingency Plan updates and testing in accordance with DOC policy, NIST guidance, and NOAA policy	Quarterly

Activity	Description of Milestone	Planned Completion
Cyber Security (cont.)	Administer annual NOAA IT security awareness training	Q3 Annually
	Complete annual FISMA Report	Q4 Annually
Enterprise Architecture	Leverage service-based IT across multiple goals and business needs	Quarterly
	Facilitate implementation of an enterprise-wide data management architecture	Quarterly
	Facilitate planning and transition to mission services upon an enterprise infrastructure services architecture	Quarterly
	Update Data Center Consolidation Inventory and Implementation Plan	Q4 Annually
Shared Services	Provide cost-effective IT infrastructure services across the enterprise	Quarterly
	Deliver customer-focused IT services for the enterprise	Quarterly
Homeland Security	Plan & conduct annual NOAA HQ Continuity of Operations (COOP) exercise	Q3 Annually
	Update NOAA COOP Plan	Q4 Annually

PPI Schedule and Deliverables:

Milestone	Description of Deliverable	Planned Completion
Annual Guidance Memorandum	Provides NOAA-wide annual guidance focusing analytical attention based on the Strategic Plan, Administration priorities, recent execution/evaluation, fiscal, and policy environment. It also identifies NOAA's near-term priorities and initial fiscal guidance for planning cycles.	Q4 Annually
NEPA Analysis/Reviews	NOAA is charged by the White House Council on Environmental Quality with implementing the National Environmental Policy Act (NEPA) from a corporate (NOAA-wide) perspective.	Quarterly
Economic Statistics	Ensures that information regarding the social science benefits of NOAA's programs is corporately collected and clearly conveyed via appropriate media such as websites and printed materials.	Quarterly
Performance Measure Analysis	The Government Performance and Results Act, enacted by Congress in 1993, instituted formal requirements for strategic planning and performance measurement in the Federal government. GPRA requires that agencies develop strategic plans, annual performance plans, and annual program performance reports.	Q4 Annually

Performance Goals and Measurement Data:

AGO

Performance Measure: Timeliness of acquisition actions	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	86%	85%	85%	85%	85%	85%	85%

Description: This measure tracks the percentage of on-time acquisition actions as measured against NOAA's published Procurement Action Lead Time (PALT) schedule. Timeliness is measured against the published PALT metrics (for each acquisition package) and is measured from the receipt of a requisition to the date of award. The dates are tracked in the CRequest/CBuy procurement system. Percentages represent meeting the published PALT for that transaction.

Performance Measure: Timeliness of grants actions	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	97%	90%	90%	90%	90%	90%	90%

Description: This measure tracks the percentage of on-time grants actions as measured against NOAA's published Procurement Action Lead Time (PALT) schedule. Timeliness is measured against the PALT metrics (for each grant application) and is measured from the receipt of an application to the date of award. The dates are tracked in the Grants Online system. Percentages represent meeting the published PALT for that transaction.

Performance Measure: Customer Satisfaction with Service	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	98%	90%	90%	90%	90%	90%	90%

Description: This measure is the average customer rating on customer satisfaction surveys. This measure tracks the satisfaction level of AGO customers, reporting the percentage of client responses that are 4 or higher on a 1-5 scale (5 representing the highest satisfaction level).

CFO

Performance Measure: Complete End-of-Year Execution Reviews for NOAA Line Offices	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	90%	90%	90%	90%	90%	90%	90%
Description: This performance measure relates to the target levels for the Budget Office to complete the End-of-Year Execution Reviews for all NOAA Line Offices.							

Performance Measure: Expend CFO Office Funding by Year End	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	92%	92%	92%	92%	92%	92%	92%
Description: This performance measure relates to the target levels for the CFO Office to expend all appropriated funding by the end of fiscal year.							

Performance Measure: Prompt Payment of Vendor Invoices without penalty	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	98%	98%	98%	98%	98%	98%	98%
Description: This performance measure relates to the target levels for the Finance Office to pay all vendor invoices promptly and without any penalties.							

Performance Measure: Financial Statement and Regulatory report submissions	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	100%	100%	100%	100%	100%	100%	100%
Description: This performance measure relates to the target levels for the Finance Office to submit all Financial Statements and Regulatory Reports by the due date.							

OCIO

Performance Measure: Percentage of systems in operation with full Authority to Operate (ATO)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	100%	100%	100%	100%	100%	100%	100%
Description: The Authorization and Accreditation (A&A) process requires a fully-tested system with a complete set of security documentation (e.g., approved security plan, risk assessment, disaster recovery plans, security testing), prior to the issuance of a full ATO. All systems in NOAA (approximately 110-120 at any given point in time) have been inventoried for their relative ranking as National Critical, Mission Critical, or Business Essential. This IT measure reports the percentage of NOAA IT Systems that have completed the A&A process and operate under a full ATO. Systems with a full ATO have completed the A&A prescribed by FISMA – security controls are in place for those systems and their FISMA documentation has been verified. Targets are updated annually by DOC/OCIO.							

PROGRAM CHANGES FOR FY 2016:

NOAA-Wide Corporate Services and Agency Management Base: Building Capacity to Provide NOAA-Wide Corporate Services: (Base Funding: \$114,632,000 and 642 FTE;

Program Change: +4,341,000 and +11 FTE): NOAA requests an increase of \$4,341,000 and 11 FTE for a total of \$118,973,000 and 653 FTE for the continued implementation of the new Departmental business systems and to improve performance of the corporate services functions across NOAA.

Proposed Actions:

This increase will provide for systems implementation of the departmentally- mandated Departmental Business Applications Suite Solutions (BAS) and to improve oversight, guidance, and advisory services provided through the corporate services business lines. Through these investments, NOAA will improve its efficiency and address service gaps in delivering NOAA's core mission while promoting organizational excellence. This program increase will address the following:

- *BAS implementation (\$1.94M)*: The request will provide contractor support that will facilitate effective migration within NOAA to Department-mandated BAS. The resources will help NOAA integrate BAS with the finance (Core Financial System), acquisition (Comprizon Suite), real property (Federal Real Property Management), personal property (Sunflower), human resources (HR Connect), and data warehousing systems. Since NOAA will be in its first year of the migration and integration effort, funding will be allocated to approximately 30 percent project management (including, but not limited to, implementation, network assurance and optimization, deployment, and maintenance) and 70 percent change management (including, but not limited to, enterprise architecture, systems integration, and data center consolidation and optimization).

Separately, NOAA (and all DOC bureaus) pay into DOC's Working Capital Fund which, in part, covers Department costs for BAS implementation. The investments are needed at both the bureau and departmental level to addresses significant system and operational inefficiencies and redundancies and to resolves a lack of sufficient departmental managerial reporting capabilities.

- *Corporate Services Support (\$2.4M)*: The request will enable NOAA Corporate Services to improve performance in the human resources and acquisition and grants business lines by facilitating the hire of up to 15 mid-level employees (11 in FY 2016 and 4 in FY 2017) including personnel-related support costs. This will improve execution of basic support functions, mitigate risk of audit non-compliance, address succession needs, and reduce loss of institutional knowledge. For the 15 FTE associated with this plan, Program Support intends to allocate six in Acquisition and nine in Human Resources. The FTE will assist with the following expected improvements:

Acquisition and Grants will improve through the following actions:

- Additional resources will allow NOAA to move beyond the NOAALink IT strategic sourcing initiative into Pro-Tech, a new professional and technical services strategic sourcing initiative. The results will be greater effectiveness and efficiency through a focus on requirements definition and validation, independent government cost estimating, dollar savings through volume discounting, and industry investment in NOAA domains. Planned actions include the following:

- Expanding NOAA's strategic sourcing initiatives through the addition of Federal and contract positions to support robust spend analysis, technical order consolidation, better client solutions through proactive client engagement, and development of high quality Task Order specifications.
- Increasing proactive service to its NOAA clients and beginning to build toward a "Fee for Service" acquisition business model.
- Improving NOAA client services by expanding Acquisition and Grants Office (AGO) capacity to provide robust requirements definition and validation during the acquisition planning stage as well as a strong independent government cost estimates backed by robust cost validation.
- Providing improved contract management on large, highly visible projects and programs.
- Continuing efforts to address the Office of Inspector General's finding regarding Undelivered Orders and significantly reducing the time required to review and resolve the backlog of completed contracts requiring close out.
- Providing enhanced training to support NOAA's Corporate Workforce to improve expert consulting services that support highly complex and technically challenging projects.
- Providing improved tools and methods to support acquisition and financial assistance professionals.

Human Resources will improve through the following actions:

- Improving the timeliness of the mandated 80-day hiring model, providing employee and labor relations services and advancing human resources (HR) policies and processes that facilitate the hiring, development, and retention of a diverse workforce.
- Fostering and retaining productive NOAA employees and allowing adverse actions to move in a timely manner to address employee poor performance and behavior. This is a recurring complaint noted on the Federal Employee Viewpoint Survey among NOAA employees.
- Increasing compliance with Office of Personnel Management regulations and guidance pertaining to human capital management. This will provide consultative and technical support in competency management, including competency model development, updates/validation, and assessment for NOAA mission-critical occupations. Developing and implementing a robust, integrated succession management strategy to include succession planning, assessment, and development. This would include ensuring that lower-graded employees can qualify for higher-graded positions within NOAA to better retain institutional knowledge as well as continuing to infuse the workforce with entry- and mid-level employees.

Statement of Need and Economic Benefit:

NOAA's Corporate Services PPA has decreased eight percent since FY 2008, while the demands for Corporate Services functions have increased during that time. In fact, funding for the NOAA Line Offices, which require support from Corporate Services has increased 48 percent since FY 2008.

Today, NOAA's ratio of HR staff to employees serviced is half the size of agencies with a similar mission and workforce. For example, NOAA had five HR specialists dedicated to Employee and Labor Relations (ELR) functions compared to the Census Bureau, which has a similar workload and 20 ELR specialists. There has been a net increase of five ELR specialists in the fourth quarter of FY 2014 but more are needed if NOAA is to retain the new hires and meet service

requirements. Only through aggressive hiring can the Workforce Management Office (WFMO) begin to retain HR talent and meet the expectations of the customers. Slow progress in this area leads to attrition and dissatisfied customers. Funding limitations over the past several years have caused serious erosion of WFMO's FTE (NOAA's average annual separation rate is 118 employees, or 16 percent of the workforce size). The high workload and deficient staffing and tools at NOAA have contributed to attrition in the HR workforce that is twice the rate of other agencies. This has resulted in longer processing times, missing the 80-day hiring model goal, and a lack of continuity and consistency in service. For FY 2014, the average number of days for hiring was approximately 87. In FY 2014, one WFMO HR Specialist or HR Assistant serviced 117 NOAA employees compared to 71 in NIST, 111 in Census, 55 in NASA, 82 in EPA, 46 in NSF, and 68 in GSA. With the necessary funding, including additional HR specialists and HR assistants, NOAA will be able to improve its consistency in service and move closer to the 80-day hiring model, thus ensuring that NOAA's mission is more effectively realized.

The mission of AGO is to provide acquisition and financial assistance services, compliant with laws and regulations, on time and at the best value to the government. AGO supports all NOAA offices and programs and fulfills NOAA's mission through \$2 billion in awards annually. AGO plays a key role in the obligation of NOAA funds and provides high-value acquisition services, operating at below two percent of obligated dollars. In FY 2014, for example, AGO obligated approximately \$3.234 billion through acquisition and financial assistance, which breaks down as follows:

Acquisition:	\$1.345B
Financial Assistance:	\$0.869B
Transfers (mainly NASA):	\$1.020B
Total:	\$3.234B

In a September 2011 study, the Government Accountability Office looked at the fees charged by several Federal agencies for acquisition services. For acquisition services comparable to those provided by AGO, the study showed the following:

Agency/Acquisition Vehicle	Fee Rate
DOI-Assisted Acquisition Services	2.0% to 5.0% (Average between 4.0% and 5.0% for Herndon, VA office and 2% and 3% for Sierra Vista, AZ office)
GSA-Assisted Acquisition Services	1.0% to 12.0% (average of 4.0%)
GSA Multi-Agency Contract (MAC) - Networx	7.0%

If transfer obligations are included, AGO's operating cost in FY 2014 was approximately 0.8 percent of obligated dollars. If transfer obligations are excluded, AGO's FY 2014 operating cost was approximately 1.2 percent of obligated dollars.

In the FY 2015 OIG Report, *Top Management Challenges Facing the Department of Commerce*, the fifth challenge identified is Operational Excellence: Deliver better services, solutions, and outcomes that benefit the American people. This challenge is consistent with the Department of Commerce's (DOC) Strategic Goal #5 and the associated strategic objective #5.1: Strengthen organizational capabilities to drive customer-focused, outcomes-driven mission performance (OS, All Bureaus). The requested increase directly supports the DOC strategic goal and the Administrator's overarching priority to "Achieve Organizational Excellence,"

through which Corporate Offices should focus on people, teams, and tools to advance organizational excellence and identifies the following key activities:

- Encourage diversity and recruit, engage, train reward and develop our people
- Ensure that our customers – internal and external – receive the best service possible
- Modernize and renovate aging facilities and provide tools for our people to do their jobs effectively, safely and legally
- Sustain focus on financial integrity and internal controls.

To meet these objectives, AGO has implemented Direct Hire authority so that it can more quickly backfill critical positions. AGO also continues to fund training to maintain certifications. To meet increasing mission requirements, AGO must continue to augment its Federal staff with skilled contractors. Of particular significance is the need to increase strategic sourcing capability to consolidate actions and provide more efficient services and better value for the government. This will be accomplished through the continued strengthening of the existing NOAALink program and the implementation of the Professional and Technical Services strategic sourcing program (ProTech). Additionally, AGO must continue to improve its contract writing and records management systems as well as invest more time in contract administration and address the backlog of contract close-out actions.

Resource Assessment:

NOAA has identified the critical need to move toward a sustainable workforce and focus on vulnerable areas that are at greater risk of non-compliance (such as the 80-day hiring model). This investment will allow NOAA Corporate Services to move toward a leaner and technologically-integrated business operating environment. Additional Federal and contract staff is critical to help corporate offices meet NOAA's basic fiduciary duties, while also protecting the public interest, promoting organizational excellence, providing better internal controls and supporting legal and regulatory compliance.

Failure to obtain adequate funding will impact the system implementation of BAS and will impair NOAA's ability to build capacity and improve performance of services in Human Resources and Acquisition. It will adversely impact the organization's ability to provide an adequate level of service to its NOAA clients and will ultimately undermine NOAA's priorities to ensure resilient communities, evolve the National Weather Service, advance and upgrade observational infrastructure, and achieve organizational excellence. Corporate Services will not be able to meet increasingly complex support requirements in an increasingly complex regulatory environment. To meet only NOAA's basic functions without the requested funding, NOAA will continue to implement decentralized solutions that impede efficiency and result in increased costs to NOAA Line Offices, diminishing the amount of mission work completed.

Deliverables:

- Reductions in claims, requests for equitable adjustments, protests, and late deliveries
- Improvements in Employee and Labor Relations, Workforce Information systems, and Strategic Human Capital Planning

Performance Goals and Measurement Data:

Performance Measure: Improve HR assistant and HR specialist service ratio	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase:	N/A	N/A	1:111	1:111	1:112	1:113	1:114
Without Increase:	1:117	1:117	1:118	1:119	1:120	1:121	1:122
Description: This ratio shows one Human Resource Specialist or Assistant servicing several NOAA employees. The service improves when the denominator of the ratio gets smaller.							

Performance Measure: Percent of dollars obligated through Strategic Sourcing	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase:	N/A	N/A	10%	15%	15%	20%	20%
Without Increase:	12%	10%	10%	10%	10%	10%	10%
Description: AGO is working to improve the efficiency and effectiveness of its acquisition effort by increasing the use of AGO strategic sourcing vehicles such as NOAA Link and the planned Professional and Technical Contract Services Vehicle (PRO-TECH) to acquire supplies and services for its NOAA clients. This measure will track progress by calculating the total amount of NOAA acquisition funding obligated using strategic sourcing vehicles as a percentage of the total amount of NOAA acquisition funding obligated.							

PROGRAM CHANGE PERSONNEL DETAIL

Budget Program: Program Support
Sub-Program: Corporate Services
Program Change: Building Capacity to Provide NOAA-Wide Corporate Services

Title:	Location	Grade	Number of Positions	Annual Salary	Total Salaries
HR Specialist	Silver Spring, MD	ZA-III	5	94,342	471,710
HR Specialist	Silver Spring, MD	ZA-IV	4	132,779	531,116
Contract Specialist	Silver Spring, MD	GS-13	3	104,446	313,338
Contract Specialist	Silver Spring, MD	GS-14	3	123,424	370,272
Subtotal			<u>15</u>		<u>1,686,436</u>
less Lapse	25%		<u>(4)</u>		<u>(421,609)</u>
Total full-time permanent (FTE)			11		1,264,827
2016 Pay Adjustment	1.3%				<u>16,443</u>
TOTAL					<u>1,281,270</u>

Personnel Data

	<u>Number</u>
Full-Time Equivalent Employment	
Full-time permanent	11
Other than full-time permanent	0
Total	<u>11</u>
Authorized Positions:	
Full-time permanent	15
Other than full-time permanent	0
Total	<u>15</u>

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: Program Support
Subprogram: Corporate Services
Program Change: Building Capacity to Provide NOAA-Wide Corporate Services

Object Class	FY 2016 Increase	FY 2016 Total Program
11 Personnel compensation		
11.1 Full-time permanent	1,281	59,407
11.3 Other than full-time permanent	0	479
11.5 Other personnel compensation	0	0
11.8 Special personnel services payments	0	390
11.9 Total personnel compensation	1,281	60,276
12 Civilian personnel benefits	527	16,738
13 Benefits for former personnel	0	257
21 Travel and transportation of persons	70	604
22 Transportation of things	0	256
23.1 Rental payments to GSA	250	7,684
23.2 Rental Payments to others	0	845
23.3 Communications, utilities and miscellaneous charges	118	4,144
24 Printing and reproduction	15	25
25.1 Advisory and assistance services	0	11,016
25.2 Other services	1,938	14,569
25.3 Purchases of goods & services from Govt accounts	0	0
25.4 Operation and maintenance of facilities	0	0
25.5 Research and development contracts	0	0
25.6 Medical care	0	0
25.7 Operation and maintenance of equipment	0	0
25.8 Subsistence and support of persons	0	0
26 Supplies and materials	55	977
31 Equipment	87	1,507
32 Lands and structures	0	0
33 Investments and loans	0	0
41 Grants, subsidies and contributions	0	72
42 Insurance claims and indemnities	0	1
43 Interest and dividends	0	2
44 Refunds	0	0
99 Total obligations	4,341	118,973

APPROPRIATION ACCOUNT: OPERATIONS, RESEARCH, AND FACILITIES

SUB-PROGRAM: OFFICE OF EDUCATION

The objectives of this sub-program are to

- Provide advice and counsel to the Under Secretary of Commerce for Oceans and Atmosphere in matters pertaining to education;
- Coordinate educational activities across NOAA;
- Develop NOAA's Education Strategic Plan and policy to help ensure that NOAA's education programs and activities are based on NOAA science and support the agency's cross-cutting priority of promoting environmental literacy;
- Foster American competitiveness in science, technology, engineering, and mathematics (STEM) by providing quality educational opportunities for the next generation, including competitive scholarships, internships, and professional training for post-secondary students; and
- Promote environmental literacy efforts through collaboration with external partners.

Office of Education

The Office of Education (OEd) coordinates education activities throughout NOAA through the NOAA Education Council and its working groups. OEd also represents the Agency in inter-agency education initiatives (e.g., Co-STEM, Interagency Working Group on Ocean Education, etc.). OEd supports the Educational Partnership Program (EPP) with Minority Serving Institutions (MSI), Hollings Scholarships, Competitive Education Grants, and the Bay-Watershed Education and Training (B-WET) Program.

Educational Partnership Program

EPP/MSI provides financial assistance through competitive processes to students and to MSIs that train students and conduct research in NOAA mission sciences. The program's goal is to increase the number of students, particularly from underrepresented groups, who are trained and earn degrees in sciences directly related to NOAA's mission. Long-term goals of the program include increasing the diversity of the STEM and NOAA workforces and fostering American competitiveness in STEM fields. Among EPP's accomplishments are the following:

- over 1,600 degrees granted to higher education students (who received direct support from NOAA) in NOAA mission fields since 2001
- over 75 percent of the 1,600 graduates are from underrepresented minority groups
- over 175 PhDs granted in NOAA mission disciplines
- over 1,000 students in NOAA mission fields currently in the pipeline

Ernest F. Hollings (Hollings) Scholarship Program

The Hollings Scholarship program is designed to

- increase undergraduate training in oceanic and atmospheric science, research, technology, and education;
- foster multidisciplinary training opportunities;
- increase public understanding and support for stewardship of the oceans and atmosphere and improve environmental literacy;
- recruit and prepare students for public service careers with NOAA and other natural resource and science agencies at the Federal, state, and local levels of government;
- recruit and prepare students for careers as teachers and educators in oceanic and atmospheric science; and
- improve scientific and environmental education in the United States.

Based on the President's FY 2016 Budget of \$5.983 billion, NOAA estimates it will have \$6.0 million for scholarships. Actual funding will be determined as provided in statute at one-tenth of one percent of the annual appropriation. For more information, please visit the Hollings Scholarship website: www.oesd.noaa.gov/scholarships/hollings.html.

Competitive Education Grants

NOAA's Competitive Education Grants program is the longest-standing and most comprehensive national grants program focused on environmental literacy. It is designed to improve and expand the learning, understanding, and application of earth systems science and advance STEM education. Multi-year grants and cooperative agreements are competitively awarded to a variety of educational institutions and organizations within the United States to support formal, informal, and community education projects and programs aligned with NOAA's mission. Competitive Education Grants promote public environmental literacy and fund a broad range of informal and formal education projects implemented from state to national scales.

Competitive Education Grants accomplishments include the following:

- NOAA provided \$65 million through 111 awards since the program's inception in 2005.
- Over 150 institutions have increased educational capacity to advance NOAA's mission.
- On average, each year, over 60 million learners visit an institution with a NOAA-funded exhibit or program that integrates NOAA sciences.
- In FY 2014, more than 6,000 educators will participate in an organized set of educational activities that are designed to 1) enhance their knowledge and skills and 2) provide guidance on how to integrate knowledge, skills, and NOAA resources to educate others.
- In FY 2014, more than 120,000 youth and adult learners will be directly engaged in lifelong learning activities with the aim of enhancing their own knowledge, skills, and competencies from a personal, civic, social, and/or employment-related perspective.

Bay-Watershed Education and Training (B-WET)

B-WET is an environmental education program that promotes locally relevant, experiential learning in the K-12 environment through competitive funding that promotes Meaningful Watershed Educational Experiences (MWEEs). B-WET currently serves seven areas of the country: California, Chesapeake Bay, Great Lakes, Gulf of Mexico, Hawai'i, New England, and the Pacific Northwest. B-WET accomplishments include the following:

- B-WET grants will reach an estimated 69,000 students and 2,600 teachers with FY 2015 funding for 86 new and continuing awards.
- Since program inception in 2002, NOAA has awarded over \$50 million to support more than 500 projects.
- B-WET has created a cross-region, internal evaluation system to monitor program implementation and outcomes on an ongoing basis. Data collection began in 2014 and is ongoing. Formal analysis by an external evaluator will take place upon collection of additional data. This effort complements the excellent project-level evaluation work conducted by B-WET grantees.

Schedule and Milestones:

FY 2016 – 2020

EPP

- April: Award undergraduate scholarships
- August: Fund 1st year of 5-Year Cooperative Science Center financial awards

Hollings Scholarship Program

- April: Award Hollings Scholarships

Intra/Inter-agency Coordination of STEM Education Activities

- Lead monthly Education Council meetings
- Co-lead bi-monthly (every two months) Interagency Working Group (IWG) on Ocean Education meetings
- Lead two monthly education working group meetings
- Assist OMB and lead STEM agencies in executing Administration's STEM initiative
- Participate in 12 meetings of IWG on STEM Graduate Fellowships
- Participate in three quarterly meetings of the Committee on Equal Opportunity in Science and Engineering

Competitive Education Grants

- January-February: Publish Federal Funding Opportunity
- April: Receive and process applications
- May-June: Conduct peer-review and select subset of applications for funding
- June: Conduct negotiations and submit award packages to Grants Management Division
- September: Issue awards
- October-December: Review progress reports and conduct site visits

B-WET

- October-November: Publish Federal Funding Opportunities
- December-January: Receive and process applications
- February: Conduct peer-review and select subset of applications for funding
- March-May: Conduct negotiations and submit award packages to Grants Management Division
- September: Issue awards
- October-December: Review progress reports and conduct site visits

Deliverables:

EPP

- Award 5-10 Scholarships
- Award 4-5 Cooperative Science Centers Cooperative Agreements

Hollings Scholarship Program

- Award 100-110 Hollings Scholarships

Intra/Inter-agency Coordination of STEM Education Activities

- Chair 12 Education Council meetings
- Chair 6 IWG on Ocean Education meetings
- Chair 24 education working group meetings

Competitive Education Grants

- Award 8 new multi-year competitive education grants
- Review progress reports and conduct site visits for a portfolio consisting of nearly 30 multi-year education grants
- Solicit and review more than 150 grant applications annually

B-WET

- Award 50 new competitive education grants
- Review progress reports and conduct site visits for a portfolio consisting of more than 80 education grants
- Complete pilot-testing of new evaluation system

Performance Goals and Measurement Data:

Consistent with the recommendations from the National Research Council study of NOAA's education program conducted in 2010, as well as the Department's review through the Balanced Scorecard process, the Office of Education has refined the performance measures for education programs. As the Office of Education progresses in implementing NOAA Education's Monitoring and Evaluation framework, it is anticipated that performance measure will continue to be refined.

EPP

Performance Measure: Number of EPP students supported with NOAA funding who are awarded NOAA mission-related STEM post-secondary degrees	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	94	90	90	90	90	90	90
Description: This metric represents all components of EPP including the Cooperative Science Centers (CSC) and Scholarships. The NOAA EPP supports development of programs to educate and graduate students, at the undergraduate, masters and doctoral levels, for the next-generation workforce and to increase the number of competent individuals with the knowledge and skills to support NOAA STEM activities. EPP graduates will lead innovation and technologies to enhance NOAA services and stewardship while supporting global competitiveness to advance national economic growth.							

*CSC awards end in 2016

Performance Measure: Number of EPP students from underrepresented communities supported by NOAA funding who are awarded NOAA mission-related STEM post-secondary degrees	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	57	60	60	60	60	60	60
Description: This metric covers the CSC and scholarship components of EPP. NOAA EPP funding is used to develop education, engagement, and research programs to increase the number of undergraduate and graduate students from underrepresented communities who complete degrees in NOAA mission-relevant STEM disciplines and are prepared to enter NOAA mission-relevant STEM careers or advanced education. See www.epp.noaa.gov/docs/csc_contributions_STEM_pool.pdf .							

*CSC awards end in 2016

Performance Measure: Number of EPP students hired by NOAA, NOAA contractors, other natural resource and science agencies at the Federal, state, local, and tribal levels, private sector, and academia	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	N/A	40	40	40	40	40	40

Description: The EPP aligns with NOAA mission priorities and includes education, engagement, and NOAA STEM research programs to develop students with NOAA mission-critical STEM knowledge and skills. With the collaboration and mentoring by NOAA scientists, program graduates may pursue careers at NOAA and become part of the scientific and technological workforce at resource management agencies, private sector, and academia. See www.epp.noaa.gov.

*CSC awards end in 2016

Performance Measure: Number of collaborative research projects undertaken between NOAA and EPP in support of NOAA mission	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	85	85	85	85	85	85	85

Description: Each NOAA CSC aligns with specific NOAA Line Offices and collaborates with NOAA scientists and engineers conducting research to better understand the significance of changes in the Earth's oceans, coasts, Great Lakes, weather, and climate.

*CSC awards end in 2016.

PROGRAM CHANGES FOR FY 2016:

Office of Education: Office of Education (Base Funding: \$20,431,000 and 23 FTE; Program Change: -\$4,000,000 and 0 FTE): NOAA requests a decrease of \$4,000,000 and 0 FTE for a total of \$16,431,000 and 23 FTE to fund NOAA's Office of Education (OEd).

Proposed Actions:

NOAA proposes a reduction of \$4,000,000 and 0 FTE to terminate NOAA's Competitive Education Grants program. Of the \$16,431,000 remaining, NOAA will use \$2,000,000 for OEd operations and \$14,431,000 to support the Educational Partnership Program (EPP).

In 2014, the President's Budget proposed a government-wide STEM reorganization to create a coherent framework for delivering STEM education to more students and teachers more effectively while reducing fragmentation. To support that proposal, the Administration published a Five-Year Federal Strategic Plan on STEM Education to help align the reorganization with key goals and strategies. The areas of priority for this plan include improving pre-kindergarten-through-grade-twelve (pre-K-12) instruction; increasing and sustaining youth and public engagement with STEM; enhancing undergraduate STEM education; creating a national strategy around graduate fellowships; and better serving groups historically underrepresented in STEM.

Over the past two years, agencies have made considerable progress towards a stronger and more cohesive infrastructure for delivering STEM education. For example, in implementing the Strategic Plan, mission agencies have increased coordination with the lead agencies (the Department of Education, the National Science Foundation, and the Smithsonian Institution) and are identifying ways to leverage existing resources to improve the reach of agency assets.

The 2016 budget builds on these efforts by proposing a fresh reorganization with targeted adjustments to enable more strategic investment in STEM education with a focus on building and using evidence-based practices and finding new models for leveraging assets and expertise.

While the Competitive Education Grants will be terminated in accordance with the Administration's STEM initiative, NOAA will still support teacher development and formal and informal education initiatives through the existing grant periods (3-5 years) due to the multi-year nature of prior year awards.

Resource Assessment:

The resources for this program are described in the OEd narrative.

Schedule and Milestones:

EPP

- April: Award undergraduate EPP Scholarships
- August: Fund 1st year of 5-Year Cooperative Science Center financial awards

Hollings Scholarship Program

- April: Award Hollings Scholarships

Intra/Inter-agency Coordination of STEM Education Activities

- Lead monthly Education Council meetings
- Co-lead bi-monthly (every two months) Interagency Working Group (IWG) on Ocean Education meetings
- Lead two monthly education working group meetings
- Assist OMB and lead STEM agencies in executing Administration’s STEM initiative
- Participate in 12 meetings of IWG on STEM Graduate Fellowships
- Participate in three quarterly meetings of the Committee on Equal Opportunity in Science and Engineering

Deliverables:

EPP

- Award 5-10 EPP Scholarships
- Award 4-5 Cooperative Science Center Cooperative Agreements

Hollings Scholarship Program

- Award 100-110 Hollings Scholarships

Intra/Inter-agency Coordination of STEM Education Activities

- Chair 12 Education Council meetings
- Chair 6 Interagency Working Group on Ocean Education meetings
- Chair 24 education working group meetings

Performance Goals and Measurement Data:

Consistent with the recommendations from the National Research Council study of NOAA’s education program conducted in 2010, as well as the Department’s review through the Balanced Scorecard process, OEd has refined the performance measures for education programs. OEd also hired a full-time evaluator responsible for the implementation of OEd’s Monitoring and Evaluation framework. As this process progresses, performance measures will continue to be refined.

Performance Measure:	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
Number of people that visit informal learning institutions with a NOAA-funded exhibit or program that integrates NOAA sciences, data, and other information (in thousands)							
With Decrease	N/A	N/A	26,125	16,350	16,350	0	0
Without Decrease	63,000	46,350	56,125	54,350	48,350	48,350	48,350
Description: This performance measure measures the number of people (annually) that visit museums, zoos, and aquariums with high-quality and effective STEM exhibits or programs incorporating NOAA science or services. NOAA science products and services are unique among the Federal Government and academia. The exhibits and programs funded through Competitive Education Grants incorporate these unique assets and capabilities into interactive exhibits that immerse the general public in these real-world and current issues. NOAA’s products and services are essential to explaining critical STEM issues such as climate change, oil spills, extreme weather and weather safety, appropriate management of coastal environments, and overfishing.							

Performance Measure: Institutions served by Competitive Education Grants	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Decrease	N/A	N/A	15	8	8	0	0
Without Decrease	31	23	28	27	24	24	24
Description: Number of institutions with active multi-year NOAA Competitive Education Grants that support STEM-related education exhibits and programs.							

Performance Measure: K-12 teachers and staff served by Competitive Education Grants	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Decrease	N/A	N/A	2,900	1,600	1,600	0	0
Without Decrease	6,000	5,000	5,500	5,500	4,800	4,800	4,800
Description: Number of K-12 teachers and informal education staff that benefit from professional development opportunities and curriculum materials supported by NOAA's Competitive Education Grants.							

Performance Measure: K-12 students served by Competitive Education Grants	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Decrease	N/A	N/A	975	520	520	0	0
Without Decrease	2,000	1,500	1,820	1,750	1,560	1,560	1,560
Description: Number of K-12 students that benefit from learning materials, hands-on experiential activities, and other STEM education programming and resources supported by NOAA's Competitive Education Grants.							

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: Program Support
Subprogram: Office of Education
Program Change: Office of Education

Object Class		FY 2016 Decrease	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	0	2,110
11.3	Other than full-time permanent	0	49
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	0	2,159
12	Civilian personnel benefits	0	589
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	158
22	Transportation of things	0	4
23.1	Rental payments to GSA	0	90
23.2	Rental Payments to others	0	229
23.3	Communications, utilities and miscellaneous charges	0	71
24	Printing and reproduction	0	6
25.1	Advisory and assistance services	0	92
25.2	Other services	0	642
25.3	Purchases of goods & services from Gov't accounts	0	1,762
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	61
31	Equipment	0	33
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	(4,000)	10,535
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	(4,000)	16,431

Office of Education: Bay-Watershed Education and Training (B-WET) Program (Base Funding: \$7,200,000 and 0 FTE; Program Change: -\$7,200,000 and 0 FTE): NOAA requests a decrease of \$7,200,000 and 0 FTE for a total of \$0 and 0 FTE to terminate B-WET Meaningful Watershed Educational Experiences (MWEE).

In 2014, the President's Budget proposed a government-wide STEM reorganization to create a coherent framework for delivering STEM education to more students and teachers more effectively while reducing fragmentation. To support that proposal, the Administration published a Five-Year Federal Strategic Plan on STEM Education to help align the reorganization with key goals and strategies. The priority areas for this plan include improving pre-kindergarten-through-grade-twelve (pre-K-12) instruction; increasing and sustaining youth and public engagement with STEM; enhancing undergraduate STEM education; creating a national strategy around graduate fellowships; and better serving groups historically underrepresented in STEM.

Over the past two years, agencies have made considerable progress towards a stronger and more cohesive infrastructure for delivering STEM education. For example, in implementing the Strategic Plan, mission agencies have increased coordination with the lead agencies (the Department of Education, the National Science Foundation, and the Smithsonian Institution) and are identifying ways to leverage existing resources to improve the reach of agency assets.

The 2016 budget builds on these efforts by proposing a fresh reorganization with targeted adjustments to enable more strategic investment in STEM education with a focus on building and using evidence-based practices and finding new models for leveraging assets and expertise.

Performance Measure: K-12 students served by B-WET	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Decrease	N/A	N/A	0	0	0	0	0
Without Decrease	69,000	69,000	69,000	69,000	69,000	69,000	69,000
Description: Number of K-12 students that benefit from learning materials, hands-on experiential activities, and other STEM education programming and resources supported by NOAA's B-WET.							

Performance Measure: K-12 teachers and staff served by B-WET	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Decrease	N/A	N/A	0	0	0	0	0
Without Decrease	2,600	2,600	2,600	2,600	2,600	2,600	2,600
Description: Number of K-12 teachers and informal education staff that benefit from professional development opportunities and curriculum materials supported by NOAA's B-WET.							

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: Program Support
Subprogram: NOAA Education Program
Program Change: NOAA BWET Regional Programs

Object Class		FY 2016 Decrease	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	0	0
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	0	0
12	Civilian personnel benefits	0	0
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	0
22	Transportation of things	0	0
23.1	Rental payments to GSA	0	0
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and miscellaneous charges	0	0
24	Printing and reproduction	0	0
25.1	Advisory and assistance services	0	0
25.2	Other services	0	0
25.3	Purchases of goods & services from Gov't accounts	0	0
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	0
31	Equipment	0	0
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	(7,200)	0
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	(7,200)	0

**APPROPRIATION ACCOUNT: OPERATIONS, RESEARCH, AND FACILITIES
SUB-PROGRAM: NOAA FACILITIES PROGRAM**

The NOAA Office of the Chief Administrative Officer (OCAO) provides facility planning, project planning formulation and development, and project management oversight. This program supports an integrated capital investment planning process and investments required to keep facilities in an adequate condition, fix substandard/aging facilities, renovate facilities to meet mission needs, and dispose of facilities that are no longer required.

The objectives of the NOAA Facilities Program sub-program are to:

- Provide effective long-range facility planning and capital investment planning
- Manage and execute NOAA’s facility assessment and restoration program
- Manage NOAA’s safety, environmental compliance, and energy efficiency programs
- Manage NOAA’s lease and real property acquisition and disposal program
- Manage and execute NOAA’s facility construction and modernization program

The NOAA Facilities Program provides the resources necessary to comply with existing Federal, state, and local laws, regulations, and safety requirements; and identify environmental compliance and safety issues requiring remediation. NOAA continues to implement a management system to increase awareness, oversight, and assessment. The NOAA Facilities Program supports NOAA’s mission by providing program direction and oversight to ensure NOAA’s facilities support current and future mission requirements.

Schedule and Milestones:

- Resolve 75 percent of commercial leases expiring in FY 2016 on or before the lease expiration date
- Continue to use the facility capital investment planning process to target efforts on facility optimization
- Provide adequate facility management services to the NOAA corporate campuses in Silver Spring, MD, Seattle, WA, and Boulder, CO

Performance Goals and Measurement Data:

Performance Measure:	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
Improve NOAA-owned facility portfolio Facility Condition Index (FCI)	Actual 80%	Target 79%	Target 78%	Target 77%	Target 76%	Target 76%	Target 75%
Description: An FCI of 80-84 percent is a poor facility condition. An FCI of 80 percent or lower is an unacceptable facility condition. In FY 2015, NOAA facilities will be in unacceptable condition. This measure shows the average condition of NOAA-owned facilities. The actuals and targets in this table are based on the 2010 real property condition assessment done through the Integrated Facilities Inspection Program (IFIP), a facility assessment model that uses survey data for each facility to identify the characteristics of the current inventory and estimate the deficiencies within the NOAA facility portfolio.							

PROGRAM CHANGES FOR FY 2016:

NOAA Facility Management and Construction and Safety: Restore NOAA Facilities Program (Base Funding: \$23,067,000 and 45 FTE; Program Change: +\$2,000,000 and 0 FTE): NOAA requests an increase of \$2,000,000 and 0 FTE for a total of \$25,067,000 and 45 FTE to excess surplus facilities and address deferred maintenance needs at corporate campuses.

Proposed Actions:

The facility management resources received over the past few years have been used to address only emergency repair needs. NOAA must be able to effectively manage its facilities by addressing deferred maintenance needs and excessing unneeded facilities to ensure that NOAA has safe and sustainable facilities for future mission success. NOAA will use the \$2.0 million to initiate the excess of surplus assets and address deferred maintenance at corporate campuses.

NOAA will begin to identify excess and dispose of surplus facilities, eliminating arrangements that are not cost effective and supporting NOAA's effort to right size the property portfolio by disposing of excess and underutilized assets. In order to be meaningful, these efforts must be sustained in the out years to allow for further repair of facilities, excessing of unwanted facilities, and compliance with all statutory, regulatory, and other requirements. NOAA will work closely with the General Services Administration to ensure excessing is done in accordance with all regulations and in the most effective way possible.

This increase will assist in NOAA's efforts to comply with statutory, regulatory, and other requirements governing facility management, such as the following:

- OMB M-12-12, in which agencies were directed to, "... not increase the size of their civilian real estate inventory..."
- Executive Order 13327, Federal Real Property Asset Management, which details the real property reporting and management requirements, "... in order to promote the efficient and economical use of Federal real property resources..."
- Federal Accounting Standards Advisory Board Statement of Federal Financial Accounting Standards 42: Deferred Maintenance and Repairs, which details how Agencies should account for and report on deferred maintenance.

Statement of Need and Economic Benefits:

Restoring the NOAA Facilities Program is operationally and economically advantageous to NOAA. The condition of NOAA's facilities is in decline and will continue to decline as NOAA's investment in facility condition cannot keep pace with the rate of deterioration and the accumulation of deferred maintenance. NOAA will target resources where they will be used most effectively, specifically to conduct repairs and address deferred maintenance. Addressing deferred maintenance allows NOAA to reduce the financial impact of inefficient buildings and building systems while potentially reducing energy costs and mitigating the financial and safety risk from the effects of climate change.

Additionally, excessing facilities allows NOAA to use resources to maintain and improve the condition of critical facilities that would have otherwise been used to maintain unwanted facilities. NOAA's mission success depends on the ability to use cutting-edge scientific research to protect resources, regulate industry, and protect the safety of American citizens. Providing the right facilities in the right locations, and using NOAA Facilities resources efficiently, enables NOAA to more effectively achieve its mission.

NOAA's infrastructure provides the foundation for all that NOAA accomplishes. However, rising costs and decaying infrastructure are an increasing challenge. Not implementing these steps toward reinvigorating NOAA's Facilities Program would mean that NOAA would continue to inefficiently operate NOAA facilities, leading to further deterioration of the needed NOAA facility portfolio and eventually impeding the scientific mission and threatening employee safety.

Resource Assessment:

With current resources, NOAA cannot systematically address maintenance needs nor can it properly excess unused facilities. Due to lack of resources and need for cost savings, NOAA has forgone repair and rehabilitation of NOAA's aging facility portfolio, ceased facility condition assessments, and stopped excessing unwanted facilities. OCAO has not been able to improve the condition of the facility portfolio or reduce the NOAA facility footprint and remove unwanted facilities from NOAA's responsibility.

Schedule and Milestones:

- Conduct repair and deferred maintenance projects starting with the corporate campuses (FY 2016)
- Excess surplus facilities (FY 2017–2020)

The time frame and resources needed to excess properties is highly variable due to needed environmental studies, site surveys, title search, appraisal, and restoration and remediation efforts. NOAA will excess properties in prioritized order based on a Line Office review of the list of properties and completing an estimate of the cost for environmental studies and disposal costs (either through demolition or excess through GSA excessing process) for each property.

Deliverables:

Detailed in the Performance Measure data below

Performance Goals and Measurement Data:

Performance Measure: Reduction Reduce unutilized owned real properties (annually)	FY 2014 Target	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
With Increase	N/A	N/A	3	5	5	5	5
Without Increase	N/A	N/A	0	0	0	0	0
Description: NOAA will reduce the number of unutilized owned property by beginning the excess process of 5 properties per year. The goal is to complete the excess process for identified properties by FY 2025. As of August 2012, 47 properties, totaling over 36,700 square feet, were on the list of buildings planned for excess.							

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: Program Support
Subprogram: Facilities
Program Change: Restore NOAA Facility Management Program

Object Class		FY 2016 Increase	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	0	4,741
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	41
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	0	4,782
12	Civilian personnel benefits	0	1,340
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	131
22	Transportation of things	0	2
23.1	Rental payments to GSA	0	4,813
23.2	Rental Payments to others	0	71
23.3	Communications, utilities and miscellaneous	0	176
24	Printing and reproduction	0	0
25.1	Advisory and assistance services	0	9,680
25.2	Other services	1,552	1,582
25.3	Purchases of goods & services from Gov't accounts	448	2,328
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	72
31	Equipment	0	12
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	0
42	Insurance claims and indemnities	0	77
43	Interest and dividends	0	1
44	Refunds	0	0
99	Total obligations	2,000	25,067

APPROPRIATION ACCOUNT: PROCUREMENT, ACQUISITION, AND CONSTRUCTION SUB-PROGRAM: CONSTRUCTION

The objectives of the Construction sub-program are to

- ensure that NOAA has safe, sound, and secure facilities and infrastructure to house employees; and
- ensure that the workforce is equipped with the technology and equipment needed to ensure the uninterrupted accomplishment of its critical scientific and operational mission and programs.

NOAA facilities constitute a significant and important capital investment and are integral to NOAA's mission. Improving the conditions of NOAA facilities allows NOAA to accomplish its mission safely and successfully.

NOAA uses approximately 800 different facilities (both owned and leased), and owns more than 400 buildings. NOAA's owned and leased buildings have a current replacement value (CRV) of over \$5 billion. Of that, more than 50 percent (442) are owned and operated by NOAA with a CRV of approximately \$2.5 billion. These facilities are often subject to extremes of climate and weather, and therefore require higher levels of maintenance and are more prone to unplanned repairs and investments needed to keep them safe, secure, and environmentally sound.

The NOAA Office of the Chief Administrative Officer (OCAO) has overall responsibility for NOAA Construction and is specifically responsible for the following:

- Providing capital investment planning guidance.
- Establishing enterprise-wide investment priorities for facility repair and modernization investments.
- Executing repair and modernization projects as "Provider of Choice" – optimizing investments in strengthening NOAA's Construction Program.
- Oversight and corporate reporting on execution.
- Sustaining corporate-owned complexes.

In supporting NOAA's mission and program accomplishments, the NOAA Construction Program has established the following objectives:

- Integrate facility requirements as part of NOAA's planning, programming, budgeting, and execution process;
- Sustain, restore, and modernize NOAA's facilities to optimize NOAA program and mission accomplishment; and
- Maximize opportunities for collocation within NOAA and with NOAA and its partners to promote programmatic synergy and effective use of real property assets.

PROGRAM CHANGES FOR FY 2016:

NOAA Construction: Naval Station Newport Pier Study (Base Funding: \$0 and 0 FTE; Program Change: +\$1,000,000 and 0 FTE): NOAA requests an increase of \$1,000,000 and 0 FTE for a total of \$1,000,000 and 0 FTE to conduct a Planning and Design (P&D) study to potentially extend NOAA's use of the Naval Station (NAVSTA) Newport pier in Newport, RI.

Proposed Actions:

This request funds a Planning and Design (P&D) study, including planning, design, engineering documentation, environmental assessment, and cost estimates, to potentially extend NOAA's ability to berth the fisheries survey vessel (FSV) *Henry B. Bigelow (Bigelow)* at the NAVSTA Newport pier. NOAA is proposing to complete P&D to identify necessary investments for continued berthing at NAVSTA Newport. The study would be completed in FY 2016 after which NOAA would consider the recommendation for action in later years.

Statement of Need and Economic Benefits:

Bigelow, and other vessels of its class, are longer and of deeper draft than predecessor vessels. Such vessels have more requirements of the piers at which they berth. The *Bigelow*, as an example, cannot berth at the existing Northeast Fisheries Science Center pier at Woods Hole, MA, due to its current depth.

Bigelow is temporarily berthing at NAVSTA Newport through a reimbursable Inter-service Support Agreement (ISSA) with the Navy. Existing pier conditions at NAVSTA Newport are severely restrictive; NOAA has already increased operational costs due to existing weight restrictions that require staging and fueling activities to be performed at other locations. To curtail continued degradation, in FY 2013, the pier pilings were repaired and are expected to extend the current load-bearing capacity until December 2016. Without these studies to evaluate the NAVSTA Newport facility and pier options as a homeport alternative, NOAA would need to relocate the *Bigelow* as *Bigelow's* ability to continue berthing at NAVSTA will end in the 1st quarter of FY 2017.

Resource Assessment:

The NOAA Facilities Program has no existing resources with which to perform P&D studies.

Schedule and Milestones:

- Award P&D study contract (FY 2016)
- Perform study (FY 2016)

Deliverables:

- Naval Station Newport Pier Study

Performance Goals and Measurement Data:

- Completed P&D study would plan a project that will inform homeport decision that would include NAVSTA Newport as an option for *Bigelow*

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: Program Support
Subprogram: Program Support Construction
Program Change: Naval Station Newport Pier Study

Object Class		FY 2016 Increase	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	0	0
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	0	0
12	Civilian personnel benefits	0	0
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	0
22	Transportation of things	0	0
23.1	Rental payments to GSA	0	0
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and miscellaneous charges	0	0
24	Printing and reproduction	0	0
25.1	Advisory and assistance services	0	0
25.2	Other services	1,000	1,000
25.3	Purchases of goods & services from Gov't accounts	0	0
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	0
31	Equipment	0	0
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	0
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	1,000	1,000

BUDGET PROGRAM: OFFICE OF MARINE AND AVIATION OPERATIONS

For FY 2016, NOAA requests a total of \$400,036,000 and 953 FTE for the Office of Marine and Aviation Operations, including an increase of \$152,700,000 and 4 FTE in program changes.

Office of Marine and Aviation Operations Overview

NOAA's Office of Marine and Aviation Operations (OMAO) manages an array of specialized ships and aircraft that play a critical role in the in-situ collection of oceanographic, atmospheric, hydrographic, and fisheries data in support of NOAA's environmental and scientific missions as well as administers the NOAA-wide Diving Program and Small Boat Program. OMAO staff is composed of civilians and the NOAA Commissioned Officer Corps (NOAA Corps).

The NOAA Fleet operates throughout the world supporting the full suite of NOAA missions such as fisheries research, nautical charting, hurricane reconnaissance and research, snow surveys, and specialized atmospheric and ocean research. NOAA ships range from global class oceanographic research vessels capable of exploring the world's deepest oceans to regional class ships responsible for charting the shallow bays and inlets of the United States. NOAA aircraft range from the four engine WP-3D, capable of penetrating hurricanes, to the small twin engine Twin Otters, well-suited for marine mammal surveys where slower airspeeds and higher endurance are essential.

In addition to the research and monitoring activities, OMAO ships and aircraft provide an immediate response capability. Following major natural and environmental disasters, NOAA ships and aircraft can conduct emergency navigation hazard surveys that help ports reopen quickly and obtain aerial images of disaster-torn areas. Emergency hazard surveys enable residents and emergency workers' verification of the condition of houses, bridges, and roads.

OMAO is charged with the safe and efficient operation and maintenance of the NOAA Fleet. OMAO develops annual Fleet allocation plans, conducts lifecycle maintenance, and provides centralized Fleet management including standard procedures, safety inspections, and medical services in partnership with the U.S. Public Health Service Commissioned Corps. OMAO coordinates the training and certification of officers, crew members, and scientists in at-sea and airborne safety procedures.

The NOAA Corps commands and supports the Fleet, as well as provides support to NOAA Line Offices. OMAO manages the recruitment, training, personnel assignments, and payroll for the NOAA Corps.

OMAO has two sub-programs under the Operations, Research, and Facilities (ORF) account (\$211,131,000 and 949 FTE).

- Marine Operations and Maintenance (\$178,838,000 and 828 FTE)
- Aviation Operations (\$32,293,000 and 121 FTE)

In addition, OMAO has one sub-program in the Procurement, Acquisition, and Construction account (\$6,000,000 and 0 FTE):

- Fleet Replacement (\$6,000,000 and 0 FTE), which includes the Fleet Capital Improvements and Technology Infusion and the New Vessel Construction Program, Project, or Activity (PPA) lines.

The OMAO budget includes the following other mandatory and discretionary accounts:

- NOAA Commissioned Officer Corps Retirement Pay (\$28,269,000 and 0 FTE)
- Medicare-Eligible Retiree Healthcare Fund (\$1,936,000 and 0 FTE)

Research and Development (R&D) Investments:

The NOAA FY 2016 Budget estimates for R&D investments are the result of an integrated requirements-based strategic planning process. This process provides the structure to link NOAA's strategic vision with programmatic detail and budget development, with the goal of maximizing resources while optimizing capabilities. OMAO observing infrastructure investments, such as ships and aircraft, support R&D activities of other NOAA Line Offices (LO) in the FY 2016 Budget.

The NOAA Research Council – an internal body composed of senior scientific personnel from every LO in the agency – developed NOAA's most recent Five-Year Research and Development Plan (FY 2013-2017). This plan guides NOAA's R&D activities and provides a common understanding among NOAA's leadership, its workforce, its partners, constituents, and Congress on the value of NOAA's R&D activities.

Significant Inflationary Adjustments:

NOAA's FY 2016 Base includes a total of \$4,531,000 and 0 FTE to account for the full funding requirement for inflationary adjustments to current programs for OMAO activities. This includes the estimated 2016 Federal pay raise of 1.3 percent and military pay raise of 1.3 percent as well as inflationary increases for non-labor activities, including service contracts, utilities, field office lease payments, and rent charges from the General Services Administration (GSA).

Headquarters (HQ) Administrative Costs:

In FY 2016, OMAO LO HQ will use \$5,553,000 in funds to support general management activities, financial and budgeting, and IT-related expenses, as well as supporting facilities and other general operating costs. These funds also include support for service contracts, utilities, and rent charges from GSA. Specifically, OMAO will use HQ administrative funds to support the following:

HQ Program Support Type	Description	FY 2016 Amount	FY 2016 FTE associated with OMAO HQ
General Management & Direction/Executive Management	Includes Assistant Administrator's office, Public Affairs, Information Services	\$946,000	4.2
Budget & Finance	Includes Budget, Finance, and Accounting	\$2,162,000	11.3
Facilities/Other Administrative (CAO Functions)	Includes Facilities and Security costs, as well as other CAO-related activities	\$973,000	0
Human Resources	All HR services, including EEO	\$136,000	1.0
Acquisitions and Grants	Includes Procurement Services, Acquisitions, and Grants Management	0	0
Information Technology	Includes IT-related expenses and other CIO-related activities	\$1,336,000	3.1
Total		\$5,553,000	19.6

APPROPRIATION ACCOUNT: OPERATIONS, RESEARCH, AND FACILITIES
SUB-PROGRAM: MARINE OPERATIONS AND MAINTENANCE

The Marine Operations and Maintenance (MOM) sub-program funds centralized management for NOAA's 16 active research and survey ships. Research and survey vessels are categorized by class – Global, Ocean, and Regional – based on size and capability. Global Class vessels are the largest and most capable, with the ability to work worldwide and accommodate large groups of scientists. Ocean Class vessels are designed to support integrated interdisciplinary research and survey missions and generally operate from their home port, but may occasionally work worldwide. Regional class vessels operate on the continental shelf and in the open ocean of specific geographic regions. Regional vessels have features that allow them to work within specific regional environments such as shallow areas like estuaries and bays, and have the capability to work under seasonally harsh weather conditions unique to their region of operation.

NOAA vessels are capable of conducting operations that support NOAA's programs in nautical charting, bathymetric mapping, fisheries stock assessments and research, ecosystem assessments, marine environmental baseline assessments, coastal-ocean circulation, and oceanographic and atmospheric research. In FY 2016, OMAO base funding will provide approximately 3,220 Days at Sea (DAS) to support NOAA's highest-priority programs.

Regular maintenance allows NOAA ships to meet the rigorous demands of its scientific, forecasting, and regulatory missions. MOM funding provides for general maintenance and repair of NOAA ships, including critical scientific and technical equipment necessary to meet stakeholder requirements.

The NOAA Fleet is subject to various requirements and regulations related to safety and emissions put forth by three organizations. The American Bureau of Shipping (ABS) certifies ships as seaworthy. OMAO uses ABS rules to design its maintenance program and conduct Ship Structure and Machinery Evaluations (SSME) on the NOAA Fleet. Under the Clean Air Act, the Environmental Protection Agency (EPA) promulgates regulations governing airborne emissions that affect ship engine and exhaust components. The U.S. Coast Guard (USCG) promulgates regulations on all discharges from ships so that marine environments are protected from harmful discharges.

MOM funding addresses the following objectives:

- ensures the operational readiness and maximum capability of the NOAA Fleet in support of present and future NOAA data collection;
- provides properly trained personnel, as well as fuel, warehousing, laboratory and deck equipment, and other scientific equipment necessary to meet user requirements and schedules;
- develops, with the guidance of the Fleet Council and with the implementation of the Prioritization, Allocation, and Scheduling (PAS) process, annual ship allocation schedules based on program requirements and available funds;
- provides centralized management and coordination of scheduling, port services, operating procedures, and engineering support for NOAA's ships;
- conducts Work Definition Conferences to prioritize tasks and determine availability for dockside and drydock repairs in addition to planning cyclic depot-level capital investments across the Fleet as part of the Progressive Lifecycle Maintenance program;
- trains and qualifies NOAA personnel to ensure safe and effective diving operations;

- trains and certifies NOAA Corps officers, crew, and scientists in at-sea safety requirements for their positions according to the Standards of Training, Certification and Watchkeeping for Seafarers and the International Maritime Organization conventions;
- provides NOAA Corps officers trained as engineers and scientists in NOAA program disciplines to provide mobile operational and other support; and
- provides oversight and support to enhance safety of NOAA's small-boat operations.

NOAA Fleet detail for FY 2016 is provided below:

Vessel	Length	Class	Mission	Home Port	Status
<i>Ronald H. Brown</i>	274 ft.	Global	1,4	Charleston, SC	Active
<i>Rainier</i>	231 ft.	Ocean	3	Newport, OR	Active
<i>Fairweather</i>	231 ft.	Ocean	3	Ketchikan, AK	Active
<i>Oregon II</i>	170 ft.	Regional	2	Pascagoula, MS	Active
<i>Thomas Jefferson</i>	208 ft.	Ocean	3	Norfolk, VA	Active
<i>Gordon Gunter</i>	224 ft.	Ocean	2	Pascagoula, MS	Active
<i>Oscar Elton Sette</i>	224 ft.	Ocean	2	Honolulu, HI	Active
<i>Nancy Foster</i>	187 ft.	Ocean	1,4	Charleston, SC	Active
<i>Hi'ialakai</i>	224 ft.	Ocean	1,4	Honolulu, HI	Active
<i>Oscar Dyson</i>	209 ft.	Ocean	2	Kodiak, AK	Active
<i>Henry B. Bigelow*</i>	209 ft.	Ocean	2	Newport, RI	Active
<i>Pisces</i>	209 ft.	Ocean	2	Pascagoula, MS	Active
<i>Bell M. Shimada</i>	209 ft.	Ocean	2	Newport, OR	Active
<i>Okeanos Explorer</i>	224 ft.	Ocean	1	Davisville, RI	Active
<i>Ferdinand R. Hassler</i>	123 ft.	Regional	3	New Castle, NH	Active
<i>Reuben Lasker</i>	209 ft.	Ocean	2	San Diego, CA	Active
Mission: 1 = Oceanographic Research			3 = Hydrographic Surveys		
2 = Fisheries Research			4 = Environmental Assessment		
* The <i>Henry B. Bigelow</i> is temporarily berthed in Newport, RI.					

OMAO achieves its objectives through the following sub-units:

Marine Operations Center (MOC): The MOC, based in Newport, Oregon, manages three OMAO Marine Centers – Newport, Oregon; Norfolk, Virginia; and Honolulu, Hawaii. The Marine Centers provide regional fleet management, maintenance, warehousing, supplies, repair facilities, data-processing facilities, operational support, and administrative support for NOAA's vessels. The vessels are assisted by a small support staff at the home port of most ships. NOAA vessels are strategically deployed based on the size, range, laboratory space, equipment, and accommodations necessary to meet project requirements.

NOAA Commissioned Personnel Center (CPC): CPC, headquartered in Silver Spring, Maryland, is responsible for providing a specialized workforce – the NOAA Commissioned Officer Corps (NOAA Corps) – to NOAA that has the skills to plan, prepare, and execute the acquisition of environmental and scientific data on land, at sea, and in the air. The NOAA Corps is one of the Nation's seven uniformed services. CPC is responsible for active duty NOAA Corps officers and associated human resource activities that include recruitment, appointment, training, assignment, promotion, separation, retirement, and officer entitlements.

OMAO Headquarters (HQ): Located in Silver Spring, Maryland, HQ is responsible for the formulation of policies and procedures; development of operating plans and budgets; strategic planning and performance measure management; oversight of safety and regulatory compliance; program management of ship and aircraft acquisitions; and management of IT infrastructure and IT security.

OMAO HQ also administers the following NOAA-wide activities:

NOAA Dive Program: The NOAA Dive Center (NDC) provides diver certification, technical advice, and a standardized equipment program. The NDC, in cooperation with the NOAA Diving Control and Safety Board (NDCSB), also promulgates regulations, policies, standards, and safe diving procedures and practices. NOAA maintains approximately 350 divers who, on average, perform over 9,000 dives annually in support of NOAA's mission and mandates and programmatic goals and objectives. Fleet diving activities include ship husbandry tasks such as cleaning propellers and sea strainers, conducting hull surveys for damage, and installing transducers. The work in which other NOAA divers engage includes installation of tide gauges and other observing systems. Scientists trained as divers also study and describe the special places and species that NOAA is mandated to protect and manage. These activities provide cost savings to NOAA, enable us to meet mission and mandates, enhance customer service and operational safety, and facilitate self-sufficiency at sea.

NOAA Small Boat Program (SBP): The SBP is designed to reduce risk, promote standardization, and enhance the safety of NOAA's small-boat operations. NOAA maintains approximately 350 small boats, which are operated and funded within the Line Offices. The SBP oversees and conducts small-boat inspections, facilitates small boat related training by hosting workshops and sharing related information, and provides technical and engineering assistance to the NOAA Small Boat Safety Board and Line Offices concerning small boats.

Schedule and Milestones:

- Annual ship schedules and milestones are governed by the Fleet Allocation Plan (<http://www.oma.noaa.gov/shipallocation.html>) as agreed to and signed by the NOAA Fleet Council. The Fleet Allocation Plan details the objective and duration of individual NOAA projects.
- All ships have a set drydock and dockside repair maintenance period based on ABS scheduling by ship class.

Deliverables:

FY 2016:

- In FY 2016, OMAO plans to provide the equivalent of 3,220 DAS (assuming a fuel price of \$3.77 per gallon¹). Charter vessels will be used when NOAA vessels are unable to meet the Line Office (LO) requirements based on schedule or capability. Detailed deliverables are determined on a project-by-project basis as documented in sailing instructions agreed to by OMAO and the respective LO.
- Perform Program-Funded DAS (PFD) as scheduled. In addition to OMAO-funded DAS, OMAO conducts missions funded through Service Level Agreements (SLA) with NOAA programs as well as reimbursable agreements with other agencies, such as the Environmental Protection Agency and Bureau of Ocean Energy Management. PFD are scheduled based on availability of ships and program funds.

¹ A fuel estimate of \$3.77 per gallon is consistent with the Defense Logistics Agency (DLA) Energy Standard Rate for FY 2015. OMAO purchases around 90% of fuel annually from DLA fuel sources through the SEA Card® program and through direct purchases from DLA fuel depots.

Performance Goals and Measurement Data:

Performance Measure: OMAO-funded Days at Sea	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
16 Active Ships	2,059	3,010	3,220	3,220	3,220	3,220	3,220
Description: OMAO base-funded Days at Sea. For FY 2016 and forward, NOAA assumes a fuel rate of \$3.77 per gallon consistent with DLA standard fuel prices for FY 2015							

Performance Measure: Fleet Utilization	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
16 Active Ships	58%	83%	86%	86%	86%	86%	86%
Description: The Fleet utilization rate is calculated by taking the base-funded Days at Sea (DAS) and dividing it by the maximum operating tempo of 235 DAS per active ship. In FY 2016 and forward, NOAA assumes 16 active ships at a fuel rate of \$3.77 per gallon consistent with DLA standard fuel prices for FY 2015.							

Performance Measure: Reduce the hydrographic survey backlog within navigationally significant areas (Measure 3.3h)	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
	2,207	2,556	2,717	2,717	2,717	2,717	2,717
Description: Square nautical miles surveyed per year. NOAA conducts hydrographic surveys to determine bathymetry primarily in U.S. waters significant for navigation. This activity includes the detection, location, and identification of wrecks and obstructions with side scan and multi-beam sonar technology. NOAA uses the data to produce nautical charts in a variety of formats for safe and efficient navigation. In addition to the commercial shipping industry, other user communities that benefit from this service include recreational boaters, the commercial fishing industry, port authorities, coastal zone managers, and marine spatial and emergency planners.							

PROGRAM CHANGES FOR FY 2016:

Marine Operations and Maintenance: Teacher at Sea Program (Base Funding: \$178,838,000 and 0 FTE; Program Change: \$0 and 0 FTE): OMAO requests a decrease of \$0 and 0 FTE to terminate the Teacher at Sea Program at NOAA which is part of the Administration's reorganization of STEM education. The Teacher at Sea funding will be reinvested within the Marine Operations and Maintenance program.

Proposed Actions: As part of the Administration's comprehensive reorganization of STEM education programs to increase the impact of Federal investments, NOAA proposes to terminate funding for the Teacher at Sea Program. This termination of funding will also eliminate the Teacher in the Air Program, which is a part of the larger Teacher at Sea Program. NOAA proposes to reinvest funding previously used for Teacher-at-Sea in the Marine Operations and Maintenance program, in order to more fully utilize its fleet in support of mission-critical nautical charting, bathymetric mapping, fisheries research, ecosystem assessments, coastal-ocean circulation, and oceanographic and atmospheric research.

In 2014, the President's Budget proposed a government-wide STEM reorganization to create a coherent framework for delivering STEM education to more students and more teachers more effectively while reducing fragmentation, and the Administration published a Five-Year Federal Strategic Plan on STEM Education to help align the reorganization with key goals and strategies. The areas of priority for this plan include: improving pre-kindergarten-through-grade-twelve (pre-K-12) instruction; increasing and sustaining youth and public engagement with STEM; enhancing undergraduate STEM education; creating a national strategy around graduate fellowships; and better serving groups historically underrepresented in STEM.

Over the two past years, agencies have made considerable progress towards a stronger and more cohesive infrastructure for delivering STEM education. For example, in implementing the Strategic Plan, mission agencies have increased coordination with the lead agencies (the Department of Education, the National Science Foundation, and the Smithsonian Institution) and are identifying ways to leverage existing resources to improve the reach of agency assets.

The FY 2016 Budget builds on these efforts by proposing a fresh reorganization with targeted adjustments to enable more strategic investment in STEM education with a focus on building and using evidence-based practices and finding new models for leveraging assets and expertise.

APPROPRIATION ACCOUNT: OPERATIONS, RESEARCH, AND FACILITIES
SUB-PROGRAM: AVIATION OPERATIONS

OMAO's Aircraft Operations Center (AOC), located at MacDill Air Force Base in Tampa, Florida, operates NOAA's Aircraft Fleet in support of NOAA's mission to promote global environmental assessment, prediction, and stewardship of the Earth's environment. The aircraft operate throughout the United States and around the world over open oceans, mountains, coastal wetlands, and the Arctic. AOC provides capable, mission-ready aircraft and professional crews to meet NOAA's scientific mission by assisting with global climate change and air quality studies, marine mammal population assessments, coastal erosion surveys, oil spill investigations, coastal mapping, flood prediction, and hurricane prediction modeling. AOC flight crews operate in some of the world's most demanding flight regimes, including flying into the eye of a hurricane.

The variety and versatility of NOAA's aircraft provide scientists with the airborne platforms necessary to collect essential environmental and geographic data. The Fleet is equipped with comprehensive data collection systems that are capable of assessing the environment, coastal and marine resources, and severe weather. OMAO also ensures that contracted aviation operations are conducted safely by providing technical support, services, and equipment to NOAA programs.

In FY 2016, AOC plans to provide approximately 4,063 OMAO-funded flight hours in support of NOAA's mission. Additional flight hours also may be funded by programs as determined during the year of budget execution, based on the availability of aircraft and funds.

Aviation Operations funding addresses the following objectives:

- Provide NOAA with centralized aircraft systems management and coordination of airborne data collection flight time;
- Modify, maintain, and operate aircraft with a workforce of specially-trained civilians and officers of the NOAA Corps to meet airborne data collection requirements;
- Maintain the airworthiness and operating standards of aircraft for optimum safety along with standardization of scientific systems and aircraft;
- Operate aircraft safely and in compliance with Federal Aviation Administration regulations regarding use of airspace, control of air traffic, and aircraft registration;
- Develop and operate prototype and operational scientific-research instrumentation aboard NOAA aircraft;
- Conduct applied research to ensure validity of data collected;
- Recommend and implement specialized modifications, equipment, or personnel for particular missions or projects;
- Develop, with the guidance of the Fleet Council, annual flight time allocation schedules based on airborne data collection requirements; and
- Provide centralized expertise in aviation safety to arrange for safe commercial aviation services for NOAA programs using contracted aircraft.

NOAA's Aircraft Fleet detail for FY 2016, including information for the current program, is provided below:

Aircraft	Type	Mission	Location	Status
HEAVY: (2) Lockheed WP-3D	4-engine turbo prop	Air quality (OAR) Hurricane research (OAR) Hurricane reconnaissance (NWS) Ocean winds (NESDIS, NWS) Hurricane intensity forecasting (NWS) Climate research (OAR)	MacDill AFB, FL	N42: Active N43: Active
MID: (1) Gulfstream G-IV	2-engine turbo jet	Hurricane surveillance (NWS) Hurricane intensity forecasting (NWS) Atmospheric research (OAR)	MacDill AFB, FL	Active
LIGHT: (4) Dehavilland Twin Otter DHC-6	2-engine turbo prop	Aerial surveys (NMFS) Atmospheric research (OAR) Snow/Water Resources Surveys (NWS)	MacDill AFB, FL	N46: Active N48: Active N55: Active N57: Active
(1) King Air	2-engine turbo prop	Photogrammetry (NOS) Multi-spectral scanner (NOS) Airborne bathymetric LIDAR (NOS, NWS) Post-storm damage assessment (NOS)	MacDill AFB, FL	Active
(1) Jet Prop Commander AC/695	2-engine turbo prop	Fisheries observations (NMFS) Marine mammal observations (NMFS) Snow/Water Resources Surveys (NWS)	MacDill AFB, FL	Active

Schedule and Milestones:

Annual aircraft schedules and milestones are governed by the Aircraft Allocation Plan (<http://www.omaο.noaa.gov/airallocation.html>) as agreed to and signed by the NOAA Fleet Council. The Aircraft Allocation Plan details the objective and duration of individual NOAA projects.

Deliverables:

- OMAO plans to provide 4,063 flight hours, which includes 3,454 mission hours to support NOAA's highest priorities and 609 hours for training, maintenance flights, and calibration testing (assuming a fuel price of \$3.70 per gallon²). Detailed deliverables are determined on a project-by-project basis as documented in flight instructions agreed to by OMAO and the supported Line Office.
- Perform Program-funded Hours as scheduled. In addition to the OMAO-funded flight hours, OMAO conducts missions funded through Service Level Agreements (SLA) with NOAA programs and reimbursable agreements with other agencies. Program-funded hours are scheduled based on availability of planes and program funds.

Performance Goals and Measurement Data:

Performance Measure:	FY 2014 Actual	FY 2015 Target	FY 2016 Target	FY 2017 Target	FY 2018 Target	FY 2019 Target	FY 2020 Target
OMAΟ-funded Flight Hours	4,057	3,947	4,063	4,063	4,063	4,063	4,063
Description: Number of OMAO-funded flight hours. OMAO-funded hours include both mission and non-mission hours. Non-mission hours are for training, maintenance, and calibration flights. For FY 2015 and beyond, they are calculated at 15% of the total OMAO, program, and reimbursable flight hours. For 2016 and forward, NOAA assumes a fuel rate of \$3.70 per gallon, consistent with DLA standard fuel prices for FY 2015.							

² A fuel estimate of \$3.70 per gallon is consistent with the Defense Logistics Agency (DLA) Energy Standard Rate for FY2015. OMAO purchases around 90% of fuel annually from DLA fuel sources through the SEA Card® program and through direct purchases from DLA fuel depots.

APPROPRIATION ACCOUNT: PROCUREMENT, ACQUISITION, AND CONSTRUCTION SUB-PROGRAM: FLEET REPLACEMENT PROGRAM

The Fleet Replacement Program (FRP) develops requirements and acquisition strategies and monitors the modernization and construction of ships in order to meet NOAA's Days at Sea (DAS) in-situ observing requirements. FRP oversees government and contractual resources necessary to design, equip, construct, or modernize ships and ship-board systems. NOAA ships face challenges similar to other observational infrastructure, including expanded mission requirements, age and obsolescence, and finite resources for recapitalization. OMAO receives sustained funding for ongoing activities related to modernization and ship construction activities and contains two PPAs: Fleet Capital Improvements and Technology Infusion and New Vessel Construction.

Fleet Capital Improvements and Technology Infusion (FCITI) is designed to maintain and extend the service life of the ship fleet by ensuring required upgrades to ship-board systems and mission equipment are in line with the needs of the programs and safety requirements. FCITI monitors the material condition of the ships using a Ship Structure and Machinery Evaluation (SSME), which captures the ship's condition. The SSME documents the results of inspections and identifies future work requirements, which will guide future capital investment decision making. At the same time, OMAO uses manufacturer-provided information for new ships to develop maintenance profiles. As information is gathered through these means, the investment decision model will be continually updated.

In FY 2014, NOAA implemented the Progressive Lifecycle Maintenance program to improve the material condition of the NOAA ship fleet by stabilizing capital investment. This allows OMAO to plan and perform cyclic depot-level capital investments across the Fleet each year. During the maintenance cycle, ships receive regular upgrades and replacements of mission support equipment and technology infusions such as data processing capacity. The result is a Fleet maintained at a higher state of readiness; extension of ship service life; and avoidance of mechanical, structural, and mission equipment obsolescence.

The New Vessel Construction PPA funds proper oversight of ship construction activities including evaluation of requirements, reviewing proposals, and monitoring progress towards achieving goals.

NOAA Ship Recapitalization Plan

In 2008, NOAA submitted a Ship Recapitalization Plan to Congress (http://www.omaο.noaa.gov/publications/08_ship_recap_plan.pdf), which described a process to systematically replace or upgrade the Fleet in order to meet the ever changing and evolving demands of the scientific community. The plan examined 10 of the Fleet's 19 ships that would reach the end of their useful service life over the next 15 years (2010 to 2024).

For the past six years, the Ship Recapitalization Plan has served as a guide for planned investments, but events since 2008 have led NOAA to reassess the current recapitalization strategy. Through an internal review process, NOAA has revalidated at-sea data collection requirements and re-evaluated current and future in-situ ocean observing platforms. This effort supported development of NOAA's planning as well as the *Federal Oceanographic Fleet Status Report* released in May 2013

(http://www.whitehouse.gov/sites/default/files/federal_oceanographic_fleet_status_report.pdf).

The *Federal Oceanographic Fleet Status Report*, released by the National Ocean Council, co-chaired by the Council on Environmental Quality and the Office of Science and Technology Policy (OSTP), reviewed existing fleet infrastructure and modernization plans of the Federal fleet

of oceanographic-survey and research vessels.

FRP funding addresses the following objectives:

- to ensure the proper maintenance and safety of NOAA ships within American Bureau of Shipping, U.S. Coast Guard, Environmental Protection Agency, and applicable international requirements; and
- to ensure proper oversight of the design and construction of new ships that meet all applicable Federal regulations.

Schedule and Milestones:

FY 2016-2020 – Conduct progressive lifecycle maintenance

Deliverables:

Cyclic capital investments in the NOAA Fleet to improve material condition, prolong service life, and ensure continuity of ship mission availability and readiness

Out-year Funding Estimates (\$ in thousands):

Progressive Lifecycle Maintenance	FY 2015 and prior	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	CTC	Total
Change from FY 2016 Base		0	0	0	0	0	-	
Total Request	11,192	6,000	6,000	6,000	6,000	6,000	N/A	Recurring

PROGRAM CHANGES FOR FY 2016:

New Vessel Construction: Fleet Recapitalization (Base Funding: \$0 and 0 FTE: Program Change: +\$147,000,000 and +4 FTE): NOAA requests an increase of \$147,000,000 and 4 FTE for a total of \$147,000,000 and 4 FTE to construct one Ocean Survey Vessel (OSV).

Proposed Actions:

NOAA's request of \$147.0 million in FY 2016 provides funding to acquire one OSV. This action will contribute to the NOAA priority of strengthening observational infrastructure by retaining current mission capacity and expertise while at the same time positioning the NOAA Fleet for long-term, sustainable support of NOAA Line Office scientific missions through at-sea data collection and in situ observations. The request builds upon activities funded in FY 2013.

The OSV will be a multi-use platform designed to conduct a range of surveys throughout the U.S. Exclusive Economic Zone (EEZ). The OSV will be designed to have a more diverse range of capabilities and functions than other vessels in the NOAA Fleet with the capability to meet a variety of NOAA's missions such as: surveying marine mammal populations, collecting samples and observations to support ecosystem-based management activities, conducting oceanographic and climate research, mapping the ocean floor to update nautical charts, and servicing National Weather Service (NWS) buoys.

NOAA's OSV development will leverage the Navy's Auxiliary General Oceanographic Research Vessel (AGOR) class requirements/system specifications with modifications unique to NOAA's needs. AGOR is a mono-hull research vessel designed to commercial standards capable of integrated, interdisciplinary, general-purpose oceanographic research in coastal and deep ocean areas. In utilizing the AGOR design, NOAA will leverage the early work done by the Navy (primarily requirements analysis and acquisition planning) to achieve a reduction in the total procurement costs of approximately \$10.0 million. The normal window for ship acquisition is 8-10 years from initial planning to vessel delivery. The timeframe will be accelerated by utilizing the existing ship specification, source selection approach, and solicitation package all developed by the Navy's Program Executive Office – Ships.

The request is allocated to the following actions:

Program Management and Development:

This includes the costs for both NOAA and the Navy to manage the OSV from inception through completion of the vessel warranty period which ends nine months after delivery. This work includes budget development and execution, schedule development and execution, progress tracking based on ship construction progressing milestones, logistics planning, change management, requirements and design development, and source selection planning and execution. Having employees on-site for multiple phases of the acquisition is an integral part of project management.

Ship Construction:

The program costs cover the detailed design and construction. Ship construction includes: the engineering to develop the detailed construction drawings; the basic ship construction costs that include the hull, machinery, electronics, and mission systems; and all the tests and trials necessary to deliver a fully-integrated ship.

Statement of Need and Economic Benefits:

Despite the steady advancement of sampling and remote sensing technologies, ships will continue to play a key role in the acquisition of at-sea data for the foreseeable future. NOAA ships support the agency's data collection needs, such as surveying marine mammal and fish populations, mapping the ocean floor to update nautical charts, and servicing NWS weather buoys, all crucial activities that support the U.S. economy. Ships allow researchers and technology to work and conduct science at the site of NOAA's trusted resources, and to remain in that area conducting operations for extended periods of time. In addition, ships themselves serve as sampling systems. While building and operating vessels requires significant planning and investment, their unique capabilities, dependability, and capacity for efficiently collecting data makes them essential components in acquiring data.

Per the Federal Oceanographic Fleet Status Report, released May 2013 by the National Ocean Council, the Federal oceanographic fleet will experience a 50 percent decline in the number of active vessels by 2026 without further modernization. NOAA's utilization of requirements and specifications developed by other Federal partners has the potential to reduce costs and increase the ability for cross-government research opportunities. The Navy's current AGOR Program is well into the construction phase with two ships currently under construction. AGOR 27, *R/V Neil Armstrong*, will be operated by Woods Hole Oceanographic Institute, and AGOR 28, *R/V Sally Ride*, will be operated by Scripps Institute of Oceanography. The ships are scheduled for delivery in June and December 2015, respectively.

NOAA's ability to leverage existing specifications and project team reduces design risk and generates cost savings by reusing documentation from the requirements definition and basic specifications phase. If NOAA conducts the design and acquisition work itself, delivery of the first vessel would take an additional two to four years. The Navy's AGOR is being verified through the actual construction, testing, and trials process. The lessons learned can be implemented into the NOAA OSV requirements prior to award. The Navy has an experienced staff of contracting officers, cost estimators, logisticians, and in-the-shipyard construction representatives ready to manage NOAA's acquisition. NOAA and the Navy signed an Interagency Agreement in May 2014 for the Navy to acquire ships for NOAA. NOAA completed the Top Level Requirements for the OSV in September 2014.

NOAA will realize several benefits from recapitalizing its Fleet. Technological improvements in the next 5-10 years combined with the more comprehensive sensor suites will increase data gathering capabilities, allowing expanded simultaneous multi-mission operations on new vessels. Advances in green technology will be incorporated into the new ship construction, which will produce ships that are more energy efficient and have reduced environmental impacts when compared to the older vessels reaching the end of service life. By operating multiple vessels of the same class and design, NOAA will be able to realize economies of scale with common equipment and class-based designs for repair work, which further reduces labor and cost.

Without Fleet recapitalization, the NOAA Fleet will decline by 50 percent from 16 to 8 active ships between FY 2016 and FY 2028. This will limit NOAA to a maximum DAS capacity of approximately 1,900 DAS due to the T-AGOS and older legacy vessels reaching the end of their service lives. Since 2007, NOAA has already realized a decline in Fleet capacity with a reduction from 19 active vessels to the current total of 16 active vessels

Resource Assessment:

The FY 2013 Spend Plan included \$7.5 million to begin funding OSV development. Additionally, \$0.4 million from Miller Freeman sale proceeds in FY 2014 will be allocated to OSV

development. In FY 2015, sale proceeds of McArthur II (\$1.2 million) and Ka'imimoana (\$0.7 million) would provide funds to continue OSV preliminary design and U.S. Navy project management through the submission of contract proposals.

Schedule and Milestones:

FY 2014:

- Q4: OSV Top Level Requirements (TLR) document

FY 2015:

- Q2: OSV System specification finalized
- Q4: OSV Milestone (MS) 2/3 based on Department of Commerce procurement requirements
- Q4: OSV Release RFP for Phase I of contract (preliminary/contract design)

FY 2016:

- Q2: OSV Phase 1 Contract Award (Preliminary/Contract Design)

FY 2017:

- Q3: OSV Phase II Contract Award (Detailed Design and Construction)

FY 2018:

- Q3: OSV Production Readiness Review (PRR)

Deliverables:

FY 2020: Delivery of the OSV

Out-year Funding Estimates (\$ in thousands):

Fleet Recapitalization	FY 2015 & Prior	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	CTC	Total
Change from FY 2016 Base	0	147,000	0	6,200	0	0	-	-
Total Request	9,800*	147,000	0	6,200	0	0	0	163,000

*This figure includes the FY 2013 Spend Plan funding of \$7.5 million, FY 2014 sale proceeds of \$0.4 million and FY 2015 sale proceeds of \$1.9 million.

PROGRAM CHANGE PERSONNEL DETAIL

Budget Program: Office of Marine and Aviation Operations
Sub-program: OMAO Fleet Replacement
Program Change: Fleet Recapitalization

Title:	Location	Grade	Number of Positions	Annual Salary	Total Salaries
Program Manager	Silver Spring, MD	ZP-V	1	124,995	124,995
Project Engineer	Silver Spring, MD	ZP-IV	3	89,924	269,772
Fleet Engineer	Silver Spring, MD	ZP-III	1	63,091	63,091
Subtotal			5		457,858
less Lapse		25%	-1		(114,465)
Total full-time permanent (FTE)			4		343,393
2015 Pay Adjustment	1.00%				3,434
2016 Pay Adjustment	1.30%				4,464
TOTAL					351,291

Personnel Data

	Number
Full-Time Equivalent Employment	
Full-time permanent	4
Other than full-time permanent	0
Total	4
Authorized Positions:	
Full-time permanent	5
Other than full-time permanent	0
Total	5

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: Office of Marine and Aviation Operations
Sub-program: OMAO Fleet Replacement
Program Change: Fleet Recapitalization

		FY 2016 Increase	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	\$351	\$351
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	351	351
12	Civilian personnel benefits	95	95
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	0
22	Transportation of things	0	0
23.1	Rental payments to GSA	0	0
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and miscellaneous charges	0	0
24	Printing and reproduction	0	0
25.1	Advisory and assistance services	0	0
25.2	Other services	146,554	146,544
25.3	Purchases of goods & services from Gov't accounts	0	0
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	0
31	Equipment	0	0
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	0
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	147,000	147,000

Fleet Capital Improvements and Technology Infusion: Progressive Lifecycle Maintenance Program (Base Funding: \$6,000,000 and 0 FTE; Program Change: + \$5,700,000 and + 0 FTE): NOAA requests an increase of \$5,700,000 and 0 FTE for a total of \$11,700,000 and 0 FTE to increase funding available for capital repairs to NOAA's ship fleet under the Progressive Lifecycle Maintenance program.

Proposed Actions:

In FY 2014, NOAA implemented the Progressive Lifecycle Maintenance program to improve the material condition of the NOAA ship fleet by providing stabilized capital investment. An increase in funding to this program in FY 2016 will continue OMAO's planning and performance of cyclic depot-level capital investments and technology infusion across the Fleet each year. Progressive lifecycle maintenance offers greater capacity to address needed repairs that improve the material condition of the Fleet and maximize service life. Additionally, progressive lifecycle maintenance provides a sustained capital investment in mission systems refresh and technology infusion that will ensure NOAA ships remain capable of collecting environmental data to support NOAA's mission and the public's need for accurate and reliable information.

This progressive lifecycle maintenance model emulates established benchmarks and best practices from industries as diverse as the aviation industry and the U.S. Coast Guard Surface Forces Logistics Centers. The approach for ship capital investment in the Progressive Lifecycle Maintenance program rotates the type and intensity of capital investment throughout the Fleet, providing balance year-over-year and more reliability over time. This action will contribute to the NOAA priority of achieving organizational excellence by reducing risk and uncertainty in capital investment and ensuring mission function continuity and availability.

Under this program, former Major Repair Periods (MRPs) are broken into smaller components, allowing OMAO to focus on key ship-board systems throughout the Fleet on a regular basis. During the maintenance cycle, each ship in the NOAA Fleet would receive regular upgrades and replacement of mission support equipment as well as technology infusions such as data processing capacity. This approach eliminates the accumulation of capital repairs that would typically occur prior to an MRP. The result is a Fleet maintained at a higher state of readiness, extended ship service life, and avoidance of mechanical, structural, and mission equipment obsolescence. The chart below lists the types of capital investments that will vary from year-to-year based on the results of Ship Structure and Machinery Evaluations (SSMEs) that assess the material condition of the ships and determine priority repairs.

Crew Space Refurbishment	Science/ Mission Space Refurbishment	Shipboard Systems	Underwater Body	Mission Systems Refresh
<ul style="list-style-type: none"> • Refrigeration systems • HVAC refurbishment • Environmental equipment replace 	<ul style="list-style-type: none"> • Space renovation • Government furnished equipment 	<ul style="list-style-type: none"> • Propulsion & generation systems overhaul • Re-piping • Fire suppression upgrades • Machinery monitoring upgrades 	<ul style="list-style-type: none"> • Blast hull • Refurbish props/shafts • Refurbish valves/ piping 	<ul style="list-style-type: none"> • Multi-beam sonars and sensors • Ship-board electronic data processing and storage • UAS Launch/ Recovery System • Small boats and launches • Cranes, winches, davits

Statement of Need and Economic Benefits:

Prior to FY 2014, Fleet capital investment was planned and budgeted as a MRP. MRPs are mid-life vessel recapitalization repairs and upgrades. This resulted in significant budget requests for a specific ship in a given year and limited the ability of OMAO to plan future investments and acquisitions. The advantages of a capital investment program are that it:

- eliminates budget variability in a constrained fiscal environment;
- reduces risk and uncertainty ensuring mission function continuity and availability;
- reduces disruption to crews and operational schedules;
- improves reliability, adds Days at Sea back to operational capacity;
- improves procurement planning, competitiveness, and flexibility; and
- avoids accumulation of repairs helping to reduce future liability and costs.

For NOAA ships, costs increase dramatically as corrosion occurs; as well, the ability to support machinery and equipment becomes difficult as manufacturers move to new technologies. Support for older machinery and equipment has been the greatest challenge in recent years with the introduction of new control technologies and added environmental requirements. Corrosion and machinery support issues have occurred sooner than the 20 to 25 years of expected service life of NOAA ships; OMAO already is experiencing these issues with the newer Fisheries Survey Vessels. Progressive lifecycle maintenance funds will allow OMAO to address these issues on ships, achieve service life extension, reduce the need for substantial structural repairs, and reduce unplanned maintenance. The funds will also allow for an assessment of available technologies required to maintain ship machinery and equipment for the second twenty years of a ship’s service life. The cost to address repairs needed to keep vessels operational is many times less than acquiring a new vessel of similar capability.

Resource Assessment:

The Consolidated and Further Continuing Appropriations Act, 2015, provides \$6.0 million for the Progressive Lifecycle Maintenance program. Capital investments for ships can range from \$7.0 million to \$15.0 million annually, varying from year-to-year based on the ships and the results of SSMEs. The additional funds will address the accumulation of repairs and help achieve service life extension. NOAA currently has a nearly \$17.0 million deferred maintenance backlog. Funds

provided for progressive maintenance will ultimately reduce this backlog by proactively maintaining vessels before systems fail. Funds will also provide dedicated resources for technology refresh for mission and science systems ensuring that OMAO is able to provide scientists and researchers with tools to effectively meet NOAA’s data collection requirements.

Schedule and Milestones:

FY 2016-2020 – Conduct progressive lifecycle maintenance

Deliverables:

Cyclic capital investments in the NOAA Fleet to improve material condition, prolong service life, and ensure continuity of ship mission availability and readiness

Performance Goals and Measurement Data:

Out-year Funding Estimates (\$ in thousands):

Progressive Lifecycle Maintenance	FY 2015 & Prior	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	CTC	Total
Change from FY 2016 Base		5,700	5,700	5,700	5,700	5,700	-	-
Total Request	11,192	11,700	11,700	11,700	11,700	11,700	N/A	Recurring

PROGRAM CHANGE DETAIL BY OBJECT CLASS
(Dollar amounts in thousands)

Budget Program: Office of Marine and Aviation Operations
Subprogram: OMAO Fleet Replacement
Program Change: Progressive Lifecycle Maintenance Program

Object Class		FY 2016 Increase	FY 2016 Total Program
11	Personnel compensation		
11.1	Full-time permanent	\$0	\$0
11.3	Other than full-time permanent	0	0
11.5	Other personnel compensation	0	0
11.8	Special personnel services payments	0	0
11.9	Total personnel compensation	<hr/> 0	0
12	Civilian personnel benefits	0	0
13	Benefits for former personnel	0	0
21	Travel and transportation of persons	0	0
22	Transportation of things	0	0
23.1	Rental payments to GSA	0	0
23.2	Rental Payments to others	0	0
23.3	Communications, utilities and miscellaneous charges	0	0
24	Printing and reproduction	0	0
25.1	Advisory and assistance services	0	0
25.2	Other services	5,700	8,797
25.3	Purchases of goods & services from Gov't accounts	0	455
25.4	Operation and maintenance of facilities	0	0
25.5	Research and development contracts	0	0
25.6	Medical care	0	0
25.7	Operation and maintenance of equipment	0	0
25.8	Subsistence and support of persons	0	0
26	Supplies and materials	0	958
31	Equipment	0	1,490
32	Lands and structures	0	0
33	Investments and loans	0	0
41	Grants, subsidies and contributions	0	0
42	Insurance claims and indemnities	0	0
43	Interest and dividends	0	0
44	Refunds	0	0
99	Total obligations	<hr/> 5,700	11,700

APPROPRIATION ACCOUNT: NOAA Corps Retirement Pay (Mandatory)

The retirement system for the uniformed services provides a measure of financial security after release from active duty for service members and their survivors. It is an important factor in the choice of a career in the uniformed services, and the legal mandate for rates to be paid is the same for all uniformed services, see 10 USC. Retired pay is an entitlement to NOAA Commissioned Corps officers under 33 USCA 3044, 33 USCA 3045, and 33 USCA 3046. Retired pay funds are transferred to the U.S. Coast Guard (USCG), which handles the payments each year as adjusted pursuant to the Department of Defense Authorization legislation. Healthcare funds for non-Medicare-eligible retirees, dependents, and annuitants are administered by the Office of Marine and Aviation Operations (OMAO).

Legal authority for retirement of NOAA Commissioned Corps officers is contained in 33 USCA 3044. Retired officers of the NOAA Commissioned Corps receive retirement benefits that are administered by USCG, in accordance with a Memorandum of Agreement between the USCG and NOAA, with funds certified by the Commissioned Personnel Center within OMAO.

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Department of Commerce
National Oceanic and Atmospheric Administration
NOAA Corps Retirement Pay (Mandatory)
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

Exhibit 5

	Positions	FTE	Budget Authority	Direct Obligations
FY 2015 Currently Available	0	0	28,269	28,269
plus: 2016 Adjustments to Base	0	0	0	0
FY 2016 Base	0	0	28,269	28,269
plus: 2016 Program Changes	0	0	0	0
FY 2016 Estimate	0	0	28,269	28,269

		FY 2014		FY 2015		FY 2016		FY 2016		Increase/ (Decrease)	
		Actuals		Currently Available		Base		Estimate			
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
NOAA Corps	POS/BA	0	28,269	0	28,269	0	28,269	0	28,269	0	0
Retirement Pay	FTE/OBL	0	26,147	0	28,269	0	28,269	0	28,269	0	0
Total: NOAA Corps	POS/BA	0	28,269	0	28,269	0	28,269	0	28,269	0	0
Retirement Pay	FTE/OBL	0	26,147	0	28,269	0	28,269	0	28,269	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
NOAA Corps Retirement Pay (Mandatory)
SUMMARY OF RESOURCE REQUIREMENTS
(Dollar amounts in thousands)

Exhibit 5

	FY 2014 Actuals		FY 2015 Currently Available		FY 2016 Base		FY 2016 Estimate		Increase/ (Decrease)	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Direct Discretionary Obligation	0	26,147	0	28,269	0	28,269	0	28,269	0	0
Total Obligations	0	26,147	0	28,269	0	28,269	0	28,269	0	0
Adjustments to Obligations:										
Unobligated balance	0	2,122	0	0	0	0	0	0	0	0
Total Budget Authority	0	28,269	0	28,269	0	28,269	0	28,269	0	0
Financing from Transfers and Other:										
Net Appropriation	0	28,269	0	28,269	0	28,269	0	28,269	0	0

Department of Commerce
 National Oceanic and Atmospheric Administration
 NOAA Corps Retirement Pay (Mandatory)
SUMMARY OF REQUIREMENTS BY OBJECT CLASS
 (Dollar amounts in thousands)

Object Class	FY 2014 Actuals	FY 2015 Currently Available	FY 2016 Base	FY 2016 Estimate	Increase/ (Decrease)
Other purchases of goods and services from Govt accounts	26,147	28,269	28,269	28,269	0
Total Obligations	28,269	28,269	28,269	28,269	0
Less prior year recoveries	0	0	0	0	0
Less unobligated balance, SOY	0	0	0	0	0
Plus unobligated balance, EOY	(2,122)	0	0	0	0
Offsetting collections, Mandatory	0	0	0	0	0
Less: Previously Unavail. Unoblig. Bal.	0	0	0	0	0
Total Budget Authority Mandatory	28,269	28,269	28,269	28,269	0
 Personnel Data					
Full-Time equivalent Employment:					
Full-time permanent	0	0	0	0	0
Other than full-time permanent	0	0	0	0	0
Total	0	0	0	0	0
Authorized Positions:					
Full-time permanent	0	0	0	0	0
Other than full-time permanent	0	0	0	0	0
Total	0	0	0	0	0

**APPROPRIATION ACCOUNT: Medicare-Eligible Retiree Healthcare Fund
Contribution - NOAA Corps**

The FY 2003 Department of Defense Authorization Act requires all uniformed services, including NOAA, to participate in an accrual fund for Medicare-eligible retirees. Payments into this accrual fund will cover the future health care benefits of present, active-duty NOAA officers and their dependents and annuitants. For FY 2016, payments to the accrual fund are estimated at \$1,936,000.

Department of Commerce
 National Oceanic and Atmospheric Administration
 Medicare Eligible Retiree Health Fund Contribution – NOAA Corps
SUMMARY OF RESOURCE REQUIREMENTS
 (Dollar amounts in thousands)

	Positions	FTE	Budget Authority	Direct Obligations
FY 2015 Currently Available	0	0	1,936	1,936
plus: 2016 Adjustments to Base	0	0	0	0
FY 2016 Base	0	0	1,936	1,936
plus: 2016 Program Changes	0	0	0	0
FY 2016 Estimate	0	0	1,936	1,936

		FY 2014		FY 2015		FY 2016		FY 2016		Increase/	
		Actuals		Currently Available		Base		Estimate		(Decrease)	
		Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount
Medicare Eligible Retiree	Pos/BA	0	1,936	0	1,936	0	1,936	0	1,936	0	0
Health Fund Contribution - NOAA Corps	FTE/OBL	0	1,315	0	1,936	0	1,936	0	1,936	0	0
Total: Medicare Eligible Retiree Health Fund	Pos/BA	0	1,936	0	1,936	0	1,936	0	1,936	0	0
	FTE/OBL	0	1,315	0	1,936	0	1,936	0	1,936	0	0

Department of Commerce
 National Oceanic and Atmospheric Administration
 Medicare Eligible Retiree Health Fund Contribution – NOAA Corps
SUMMARY OF RESOURCE REQUIREMENTS
 (Dollar amounts in thousands)

	FY 2014 Actuals		FY 2015 Currently Available		FY 2016 Base		FY 2016 Estimate		Increase/ (Decrease)	
	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount	FTE	Amount
Direct Discretionary Obligation	0	1,315	0	1,936	0	1,936	0	1,936	0	0
Total Obligations	0	1,315	0	1,936	0	1,936	0	1,936	0	0
Adjustments to Obligations:										
Unobligated balance	0	621	0	0	0	0	0	0	0	0
Total Budget Authority	0	1,936	0	1,936	0	1,936	0	1,936	0	0
Financing from Transfers and Other:										
Net Appropriation	0	1,936	0	1,936	0	1,936	0	1,936	0	0

Department of Commerce
National Oceanic and Atmospheric Administration
Medicare Eligible Retiree Health Fund Contribution – NOAA Corps
SUMMARY OF REQUIREMENTS BY OBJECT CLASS
(Dollar amounts in thousands)

Exhibit 16

Object Class	FY 2014 Actuals	FY 2015 Currently Available	FY 2016 Base	FY 2016 Estimate	Increase/ (Decrease)
Other purchases of goods and services from Govt accounts	1,315	1,936	1,936	1,936	0
Total Obligations	1,936	1,936	1,936	1,936	0
Less prior year recoveries	0	0	0	0	0
Less unobligated balance, SOY	0	0	0	0	0
Plus unobligated balance, EOY	0	0	0	0	0
Offsetting collections, Mandatory	0	0	0	0	0
Less: Previously Unavail. Unoblig. Bal.	0	0	0	0	0
Total Budget Authority Mandatory	1,936	1,936	1,936	1,936	0
 Personnel Data					
Full-Time equivalent Employment:					
Full-time permanent	0	0	0	0	0
Other than full-time permanent	0	0	0	0	0
Total	0	0	0	0	0
Authorized Positions:					
Full-time permanent	0	0	0	0	0
Other than full-time permanent	0	0	0	0	0
Total	0	0	0	0	0

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